

Watershed Boundary Dataset

SDE Database and Gateway Processing and Integration

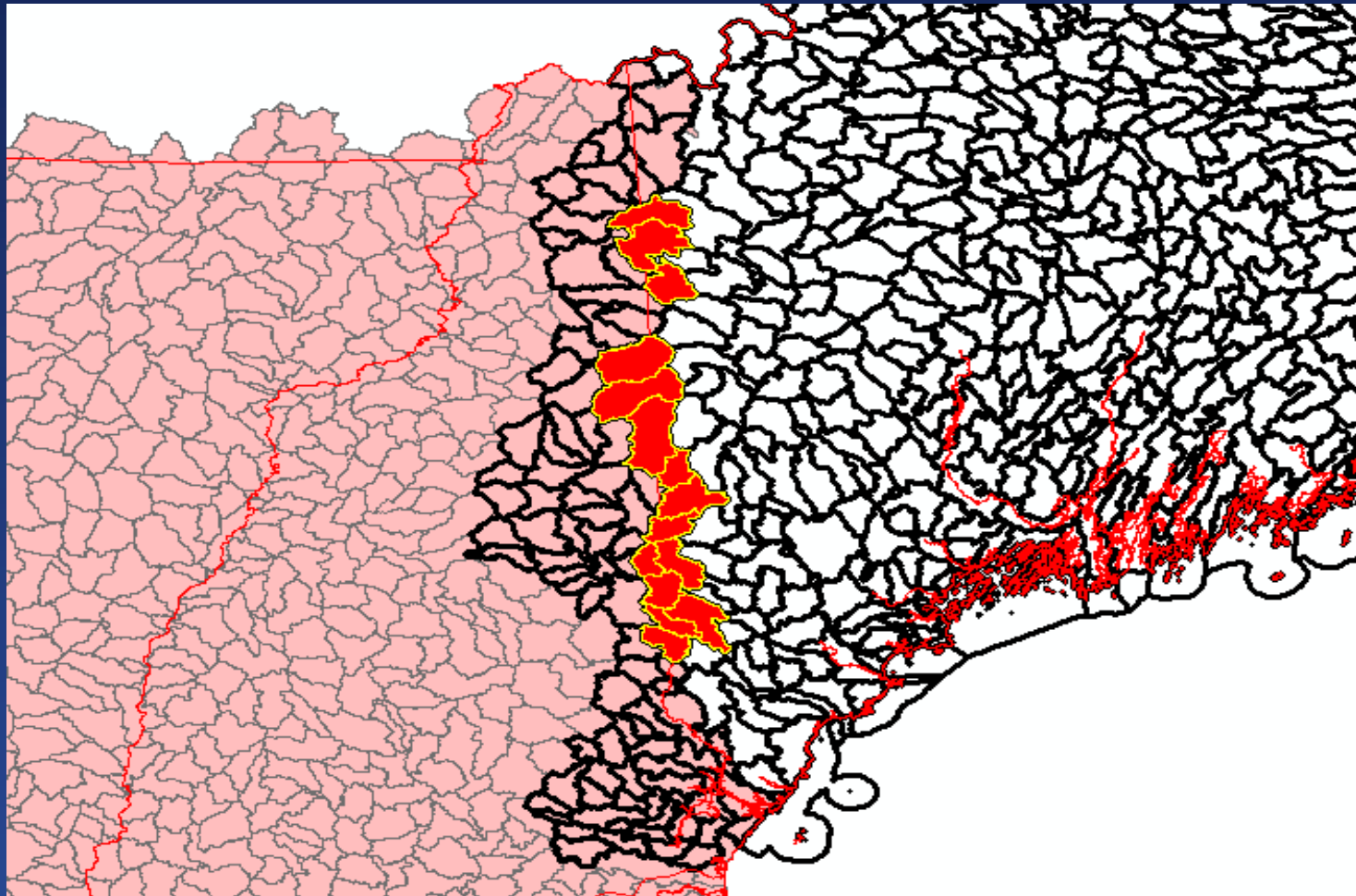
Prior to Dataset Integration

- Both NRCS and USGS put each state's watershed data through an extensive Certification Review process.
- The Technical Review Team meets to discuss if the state's dataset qualifies for Provisional or Full Certification.
- If the dataset passes and the Certification letter is signed by both NRCS (Tommie Parham) and USGS (Katherine Lins), the dataset integration and processing for the Gateway begins.

Edgematching

- First, a plan must be agreed upon by in state coordinators for each state border whose edges must be matched in order to create a seamless data flow.
- For ease of presentation purposes, I am using the Maine-New Hampshire border. Only one border has to be negotiated and integrated in this example.

Edgematching Discrepancies between Maine and New Hampshire



Sample coding problem between NH and Maine's data:

HUC_8 Code: 01040001
HUC_10 Code: 02
HUC_12 Code: 03
HUC_10 Name: Umbagog Lake Drainage
HUC_12 Name: Lake Umbagog
HUC_10 DS: 0104000106
HUC_12 DS: 010400010602
HUC_10 MOD: HM
HUC_12 MOD: HM
HUC_10 Type: S
HUC_12 Type: S
States: ME, NH

HUC_8 Code: 01040001
HUC_10 Code: 02
HUC_12 Code: 05
HUC_10 Name: Umbagog Lake Drainage
HUC_12 Name: Lake Umbagog
HUC_10 DS: 0104000106
HUC_12 DS: 010400010602
HUC_10 MOD: HM
HUC_12 MOD: HM
HUC_10 Type: S
HUC_12 Type: S
States: NH, ME

Edgematching Problems

These are the results of edgematching review that were sent back to Maine

Attributes of ME_EdgematchingProblems				
Huc_8	Huc_10	Huc_12	Shape_Area	Problem
01060003	0106000305	010600030	0.007994	Should there be a "-" between "Headwaters" and "Great East Lake"??
01060002	0106000210	010600021	0.006274	Is Huc12_DS 010600021002 (ME) or 010600021003 (NH); type S (ME) or T (NH).
01060002	0106000210	010600021	0.013622	NH data has Huc12 name as "Branch Brook", Type as "T", and Huc12 DS as 010600021003
01060002	0106000209	010600020	0.009096	NH huc12 DS is 010600020904; Types are "T"
01060002	0106000209	010600020	0.005546	NH data has huc12_DS as 010600020904.
01060002	0106000209	010600020	0.010455	NH data has huc12 code as 010600020904; huc12 name as Kezar Falls; huc12DS as 010600020905; and Types are "T".
01060002	0106000204	010600020	0.007839	Is HUC10 name according to standard?; NH has huc10 name as "Saco River-Lovewell Pond"; NH Types are "T".
01060002	0106000204	010600020	0.01299	Are huc10 and huc12 names according to standard?; huc12 DS differs from NH (010600020503); NH Types are "T".
01060002	0106000204	010600020	0.006985	Are huc10 and huc12 names according to standard?
01060002	0106000204	010600020	0.022797	is huc10 name according to standard?
01040002	0104000202	010400020	0.020457	Is huc10 name according to standard?; huc12 DS in NH data is 010400020207
01040002	0104000201	010400020	0.019593	huc12 DS in NH data is 010400020207.
01040001	0104000102	010400010	0.010439	huc12 code in NH data is 010400010203; huc12DS in NH is 010400010204.
01040001	0104000102	010400010	0.017095	huc12 code in NH is 010400010205.
01040001	0104000104	010400010	0.01239	huc12 name in NH is "Magalloway River-Sturtevant Stream".

Agreement reached between Maine (Ray Voyer) and New Hampshire (Reed Sims)

- * Ray will populate overlapping NH/ME polygons with NH names, and polygons will keep ME codes and other attributes.
- * I will clip the area of Maine's data that crosses the NH/ME border by two HUC12 polygons into the NH state boundary, then integrate and merge the two datasets.

Data Integration by NCGC

- If necessary, recalculate Acreage fields to not include data beyond decimal point. Sometimes other attributes may need to be cleaned up: spaces in names or state column is in reversed order (not alphabetic). In Maine, none of these edits are necessary at this time.
- Next, for Gateway extraction, we must create and populate LEFT_HUC_8 and RIGHT_HUC_8 columns in the linework layer of the state's WBD.
- Clip new state at agreed upon location by in state WBD coordinators; two HUC12 polygons in to NH as per agreement with NH and ME in this case.
- Create Check-Out from current SDE database of area to be edited.

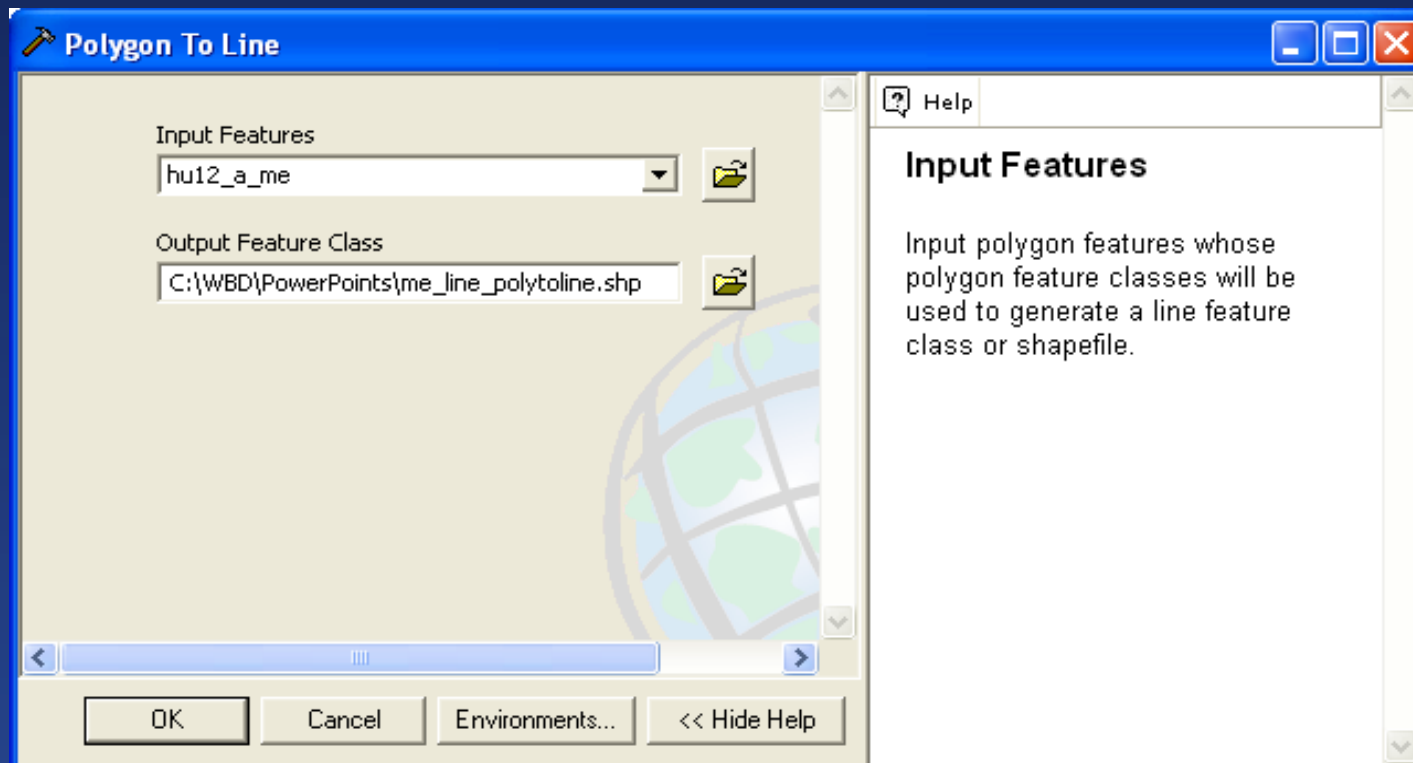
Processing, continued

- Clip old dataset (polygons and lines) in the Check-Out by the new clipped area of new state to be integrated.
- After all clipping is done, import the new state's lines and polygons into the Check-Out.
- Merge clipped polygons together to create seamless polygon layer and edit all topology errors in the polygons and linework; this takes time depending on number of errors.
- After all topology errors are corrected, synchronize the changes of the Check-Out back into the SDE layer.
- Remainder of Gateway Processing Begins.

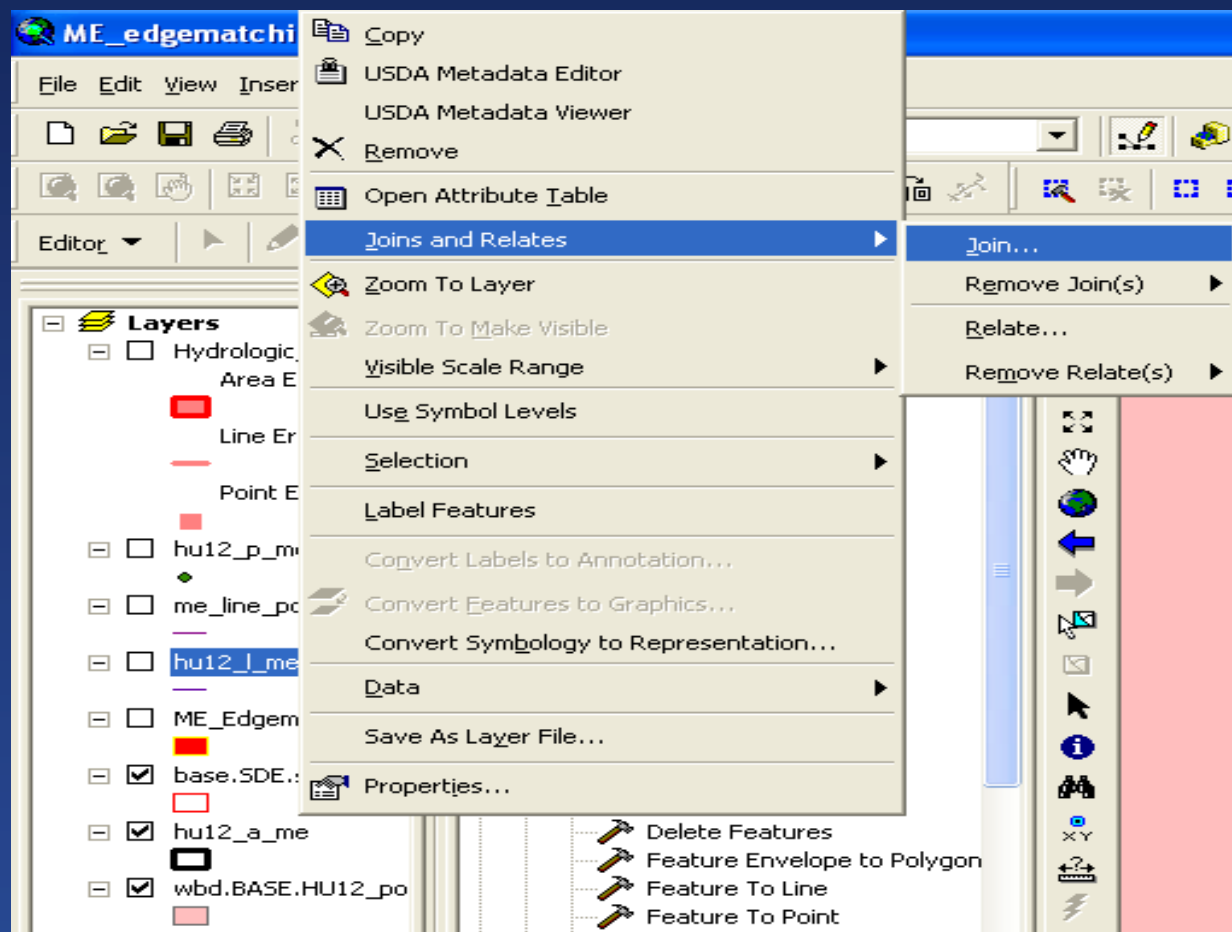
Process to Populate LEFT_HUC_8 and RIGHT_HUC_8 columns in linework {if state submits data in a geodatabase (linework (<st>_hu12_line) and polygons (<st>_hu12_poly) in separate layers)}:

- a. Use <st>_hu12_poly layer: in ArcToolbox use tool “Polygon to Line” resulting in (<st>line_polytoline); this command creates a line feature with the right and left fid of the polygon layer <st>hu12_poly.
- b. Run a spatial join of the <st>_hu12_line to the <st>_line_polytoline (resulting in <st>wbd_line_join layer).
- c. Run an attribute join of <st>_hu12_poly (objected) to the right_fid of the <st>_wbd_line_join layer.
 1. Calculate the huc8 from the <st>_hu12_poly to the RIGHT_HUC_8 of the <st>wbd_line_join.
 2. Remove all joins.
- d. Run an attribute join of <st>_hu12_poly (objected) to the left_fid of the <st>_wbd_line_join layer.
 1. Calculate the huc8 from the <st>_hu12_poly to the LEFT_HUC_8 of the <st>wbd_line_join.
 2. Remove all joins.
- e. <st>wbd_line_join is now the official linework to import in to SDE instead of <st>hu12_line.

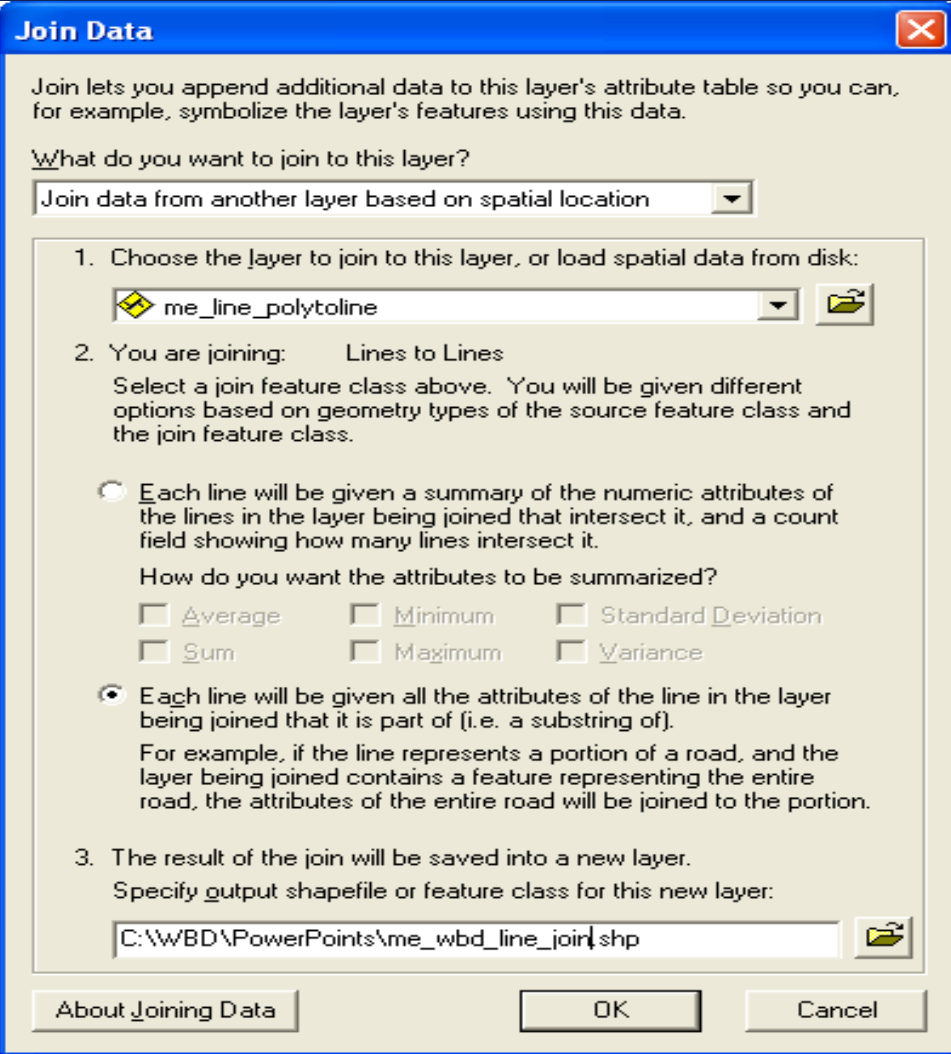
Create Line feature with **Right** and **Left FID** of the Polygon Layer



Begin Spatial Join of Original linework to the PolyToLine result:



Next step in linework join:



Join Data

Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.

What do you want to join to this layer?

Join data from another layer based on spatial location

1. Choose the layer to join to this layer, or load spatial data from disk:

me_line_polytoline

2. You are joining: Lines to Lines

Select a join feature class above. You will be given different options based on geometry types of the source feature class and the join feature class.

☐ Each line will be given a summary of the numeric attributes of the lines in the layer being joined that intersect it, and a count field showing how many lines intersect it.

How do you want the attributes to be summarized?

☐ Average ☐ Minimum ☐ Standard Deviation
☐ Sum ☐ Maximum ☐ Variance

☒ Each line will be given all the attributes of the line in the layer being joined that it is part of (i.e. a substring of).

For example, if the line represents a portion of a road, and the layer being joined contains a feature representing the entire road, the attributes of the entire road will be joined to the portion.

3. The result of the join will be saved into a new layer.

Specify output shapefile or feature class for this new layer:

C:\WBD\PowerPoints\me_wbd_line_join.shp

About Joining Data OK Cancel

Resulting in LEFT_FID and RIGHT_FID columns in the attribute table of the new layer, me_wbd_line_join.shp; then the LEFT_HUC_8 and RIGHT_HUC_8 columns are added that will be populated next:

Attributes of me_wbd_line_join

FID	Shape	OBJECTID	Hu_level	Linesource	Meta_id	Shape_Leng	FID_1	LEFT_FID	RIGHT_FID	LEFT_HUC_8
0	Polyline	1	4	OTH	ME01	0.044191	0	-1	1399	
1	Polyline	2	4	OTH	ME01	0.131511	1	-1	1397	
2	Polyline	3	4	OTH	ME01	0.131511	2	-1	1400	
3	Polyline	11	6	OTH	ME01	0.131511	5	1399	1397	
4	Polyline	12	6	OTH	ME01	0.131511	6	1399	1396	
5	Polyline	8	5	OTH	ME01	0.131511	7	1400	1399	
6	Polyline	10	5	OTH	ME01	0.131511	10	1400	1394	
7	Polyline	13	5	OTH	ME01	0.131511	11	1400	1053	
8	Polyline	14	6	OTH	ME01	0.131511	16	1399	1053	
9	Polyline	16	6	OTH	ME01	0.131511	19	1398	1397	
10	Polyline	17	4	OTH	ME01	0.131511	20	-1	1398	
11	Polyline	18	6	OTH	ME01	0.131511	21	1398	1395	
12	Polyline	23	6	OTH	ME01	0.131511	24	1397	1396	
13	Polyline	21	4	OTH	ME01	0.131511	25	-1	1394	
14	Polyline	22	4	OTH	ME01	0.131511	26	-1	1393	
15	Polyline	24	5	OTH	ME01	0.131511	30	1494	1397	
16	Polyline	25	6	OTH	ME01	0.131511	32	1397	1395	
17	Polyline	26	5	OTH	ME01	0.131511	33	1495	1397	

Record: 1

OK Cancel Options

Add Field

Name: RIGHT_HUC_8

Type: Text

Field Properties

Length: 8

Attribute Join of me_wbd_line_join layer to the original Polygon layer in order to populate RIGHT_HUC_8:

Join Data

Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.

What do you want to join to this layer?

Join attributes from a table

1. Choose the field in this layer that the join will be based on:
RIGHT_FID
2. Choose the table to join to this layer, or load the table from disk:
hu12_a_me
☒ Show the attribute tables of layers in this list
3. Choose the field in the table to base the join on:
OBJECTID

Advanced...

About Joining Data OK Cancel

Calc RIGHT_HUC_8 based on Join

Attributes of me_wbd_line_join

me_wbd_line_join.RIGHT_FID *	OBJECTID *	me_wbd_line_join.RIGHT_HUC_8
1399	1399	
1397	1397	
1400	1400	
1397	1397	
1396	1396	
1399	1399	
1394	1394	
1053	1053	
1053	1053	
1397	1397	
1398	1398	
1395	1395	
1396	1396	
1394	1394	
1393	1393	
1397	1397	
1395	1395	
1397	1397	
1396	1396	
1053	1053	
1393	1393	
1395	1395	
1395	1395	
1393	1393	
1053	1053	
1494	1494	
1394	1394	
887	887	

Field Calculator

Fields:

- me_wbd_line_join.Meta_id
- me_wbd_line_join.Shape_Leng
- me_wbd_line_join.FID_1
- me_wbd_line_join.LEFT_FID
- me_wbd_line_join.RIGHT_FID
- me_wbd_line_join.LEFT_HUC_8
- me_wbd_line_join.RIGHT_HUC_8
- hu12_a_me.OBJECTID
- hu12_a_me.Huc_8
- hu12_a_me.Huc_10
- hu12_a_me.Huc_12
- hu12_a_me.Acres

Type:

- ☒ Number
- ☐ String
- ☐ Date

Functions:

- Abs ()
- Atn ()
- Cos ()
- Exp ()
- Fix ()
- Int ()
- Log ()
- Sin ()
- Sqr ()

me_wbd_line_join.RIGHT_HUC_8 =

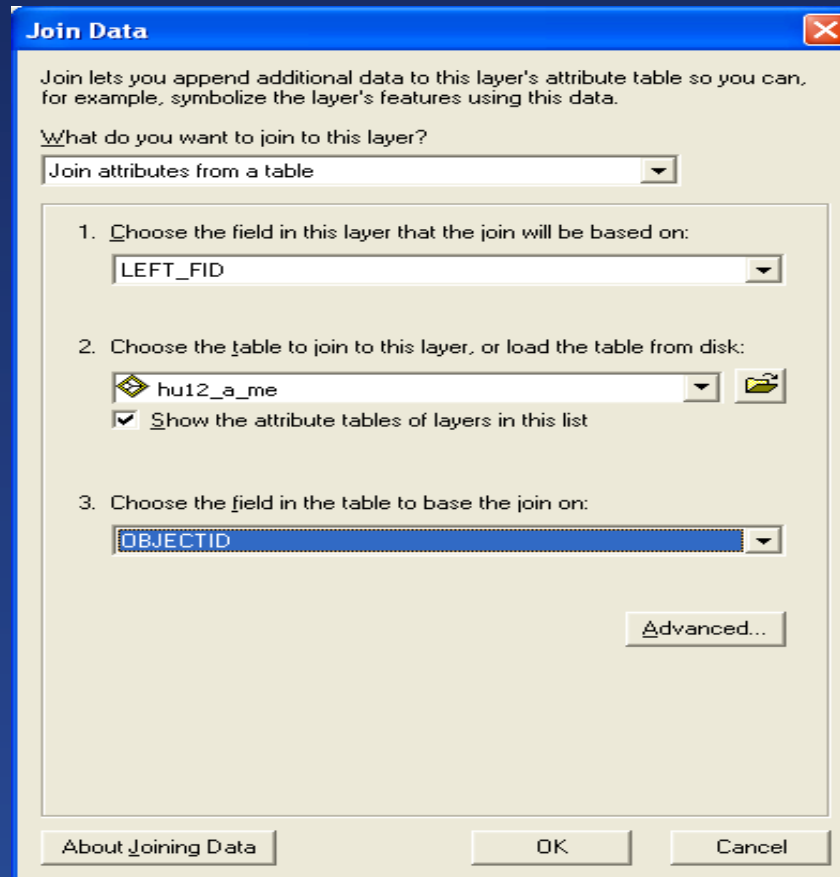
[hu12_a_me.Huc_8]

☐ Advanced

☐ Calculate selected records only

OK Cancel

Save edits, remove previous join, and do an Attribute Join again of me_wbd_line_join layer to the original Polygon layer in order to populate LEFT_HUC_8:



The image shows a 'Join Data' dialog box with a blue title bar and a red close button. The main area is light beige. At the top, it says 'Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.' Below this is a question 'What do you want to join to this layer?' followed by a dropdown menu set to 'Join attributes from a table'. The main content area has three numbered steps: 1. 'Choose the field in this layer that the join will be based on:' with a dropdown set to 'LEFT_FID'. 2. 'Choose the table to join to this layer, or load the table from disk:' with a dropdown set to 'hu12_a_me' and a folder icon to its right. Below this is a checked checkbox labeled 'Show the attribute tables of layers in this list'. 3. 'Choose the field in the table to base the join on:' with a dropdown set to 'OBJECTID'. At the bottom right of the main area is an 'Advanced...' button. At the very bottom are three buttons: 'About Joining Data', 'OK', and 'Cancel'.

Join Data

Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.

What do you want to join to this layer?

Join attributes from a table

1. Choose the field in this layer that the join will be based on:

LEFT_FID

2. Choose the table to join to this layer, or load the table from disk:

hu12_a_me

☒ Show the attribute tables of layers in this list

3. Choose the field in the table to base the join on:

OBJECTID

Advanced...

About Joining Data OK Cancel

Calc LEFT_HUC_8 based on Join

Attributes of me_wbd_line_join

OBJECTID *	me_wbd_line_join.LEFT_FID	me_wbd_line_join.LEFT_HUC_8
<Null>	-1	
<Null>	-1	
<Null>	-1	
1399	1399	
1399	1399	
1400	1400	
1400	1400	
1400	1400	
1399	1399	
1398	1398	
<Null>	-1	
1398	1398	
1397	1397	
<Null>	-1	
<Null>	-1	
1494	1494	
1397	1397	
1495	1495	
1494	1494	
1396	1396	
1394	1394	
<Null>	-1	
1495	1495	
1492	1492	
1394	1394	
1495	1495	
1492	1492	

Field Calculator

Fields:

- me_wbd_line_join.RIGHT_HUC_8
- hu12_a_me.OBJECTID
- hu12_a_me.Huc_8
- hu12_a_me.Huc_10
- hu12_a_me.Huc_12
- hu12_a_me.Acres
- hu12_a_me.States
- hu12_a_me.Ncontrb_a
- hu12_a_me.Hu_10_ds
- hu12_a_me.Hu_10_name
- hu12_a_me.Hu_10_mod
- hu12_a_me.Hu_10_type

Type:

- ☒ Number
- ☐ String
- ☐ Date

Functions:

- Abs ()
- Atn ()
- Cos ()
- Exp ()
- Fix ()
- Int ()
- Log ()
- Sin ()
- Sqr ()

me_wbd_line_join.LEFT_HUC_8 =

[hu12_a_me.Huc_8]

Advanced

Calculate selected records only

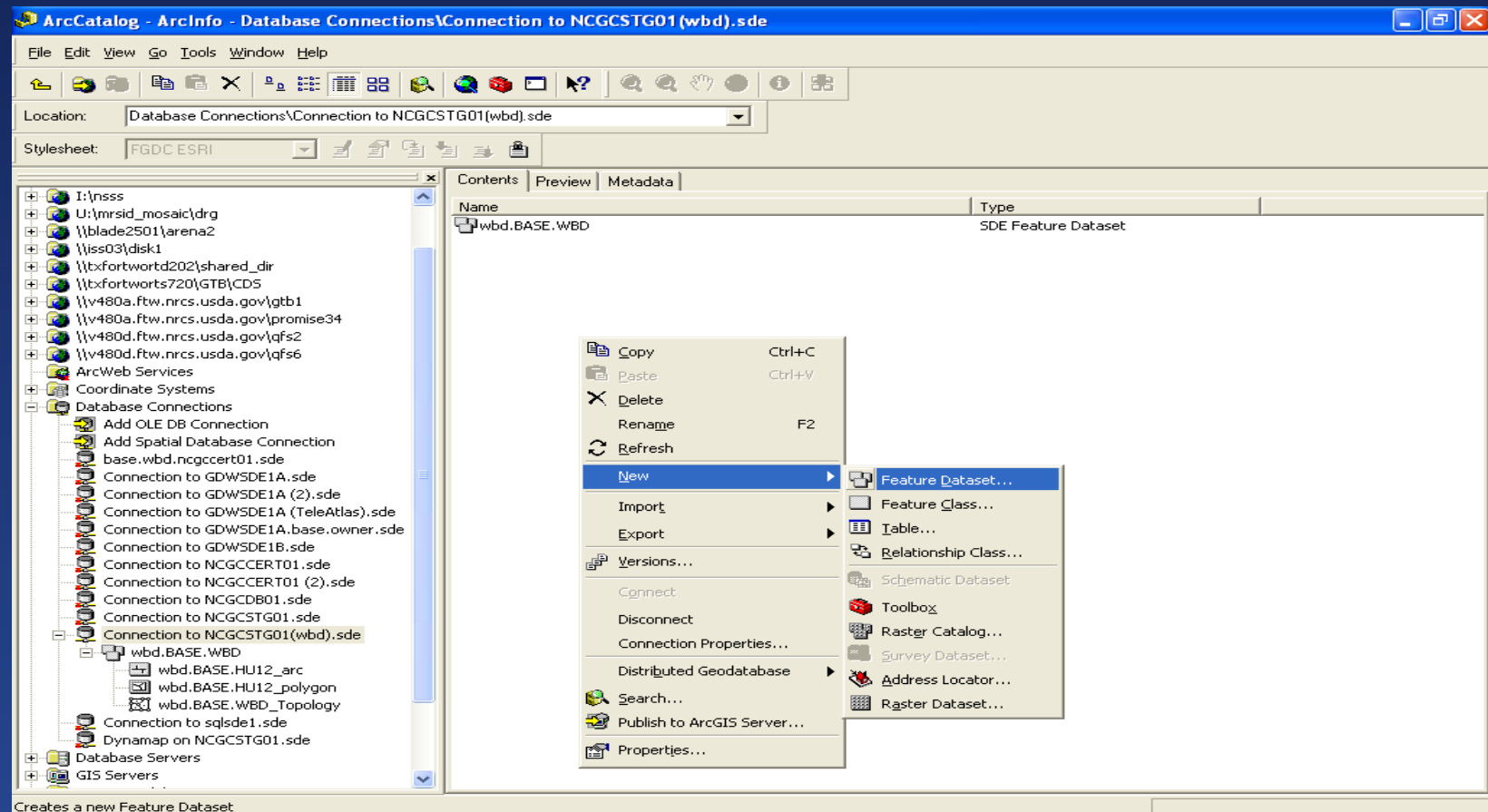
OK

Cancel

Check Topology of new linework with original polygons.

After linework attributes are complete, import the new linework and original polygons into SDE as a separate dataset; create new topology and check for errors once again before clipping and importing data into a Check-Out version of SDE.

Creating a new dataset:



United States Department of Agriculture Natural Resources Conservation Service



New Feature Dataset

Name:

New Feature Dataset

Choose the coordinate system that will be used for XY coordinates in this data.

Geographic coordinate systems use latitude and longitude coordinates on a spherical model of the earth's surface. Projected coordinate systems use a mathematical conversion to transform latitude and longitude coordinates to a two-dimensional linear system.

Name:

- Geographic Coordinate Systems
- Projected Coordinate Systems
- <Unknown>

Browse for Coordinate System

Look in:

- wbd.BASE.HU12_arc
- wbd.BASE.HU12_polygon

Name:

Show of type:

New Feature Dataset

All coordinates stored in a feature class are snapped to an underlying coordinate grid. Resolution is the cell size of this grid. Decreasing the resolution may reduce data storage needs but may reduce coordinate accuracy.

The coordinate range or domain extent defines the minimum and maximum coordinate values which can be stored.

XY

XY Resolution: Degree

Max Y:

Min X: Max X:

Min Y:

Z

Z Resolution:

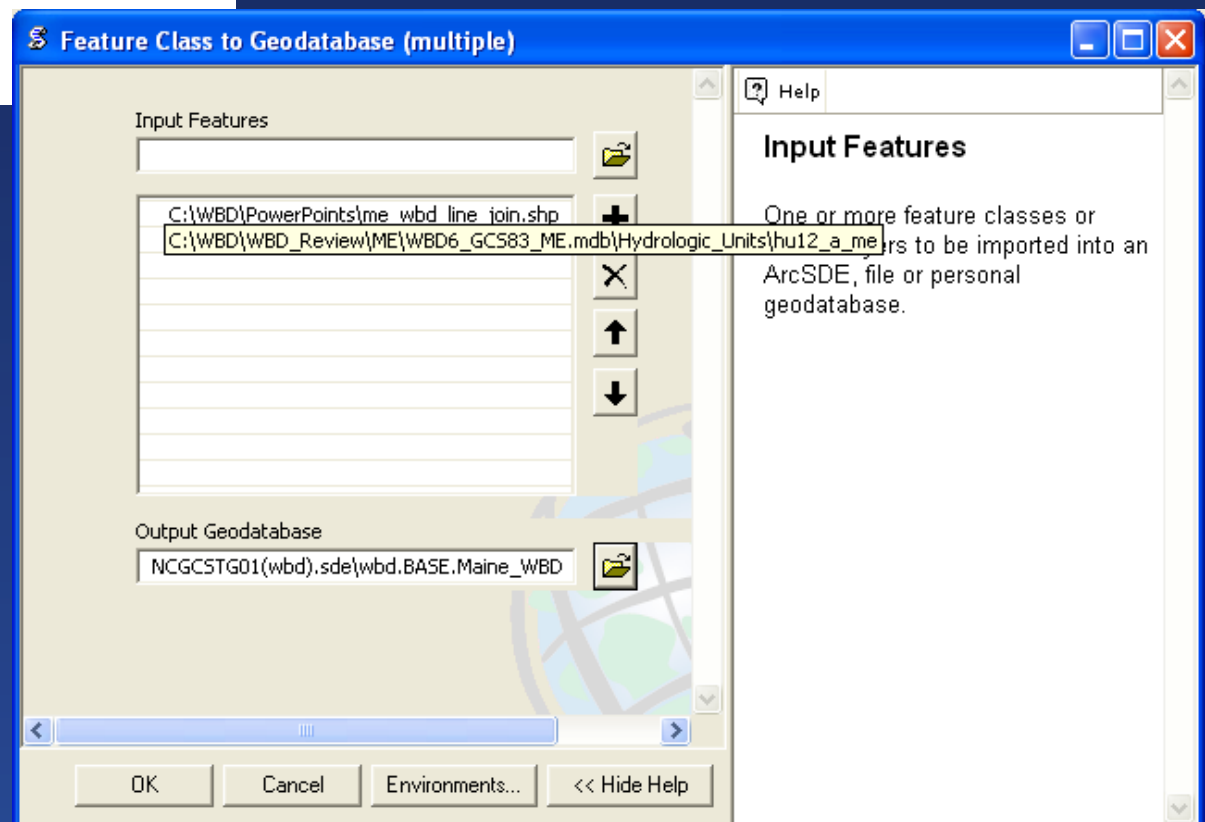
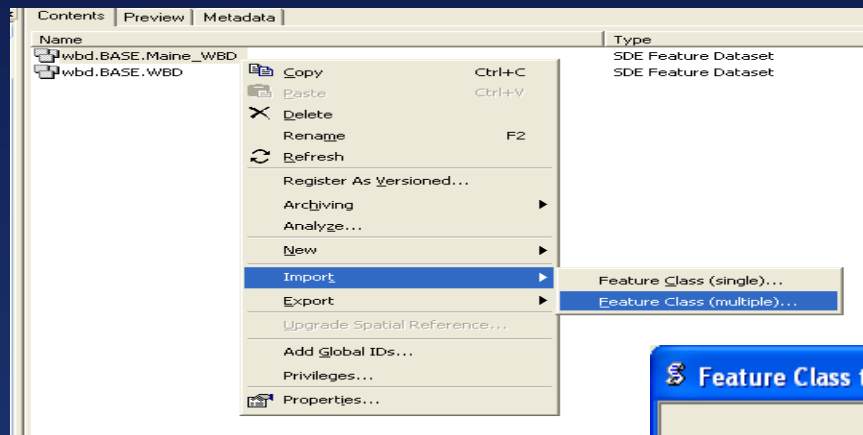
Min: Max:

M

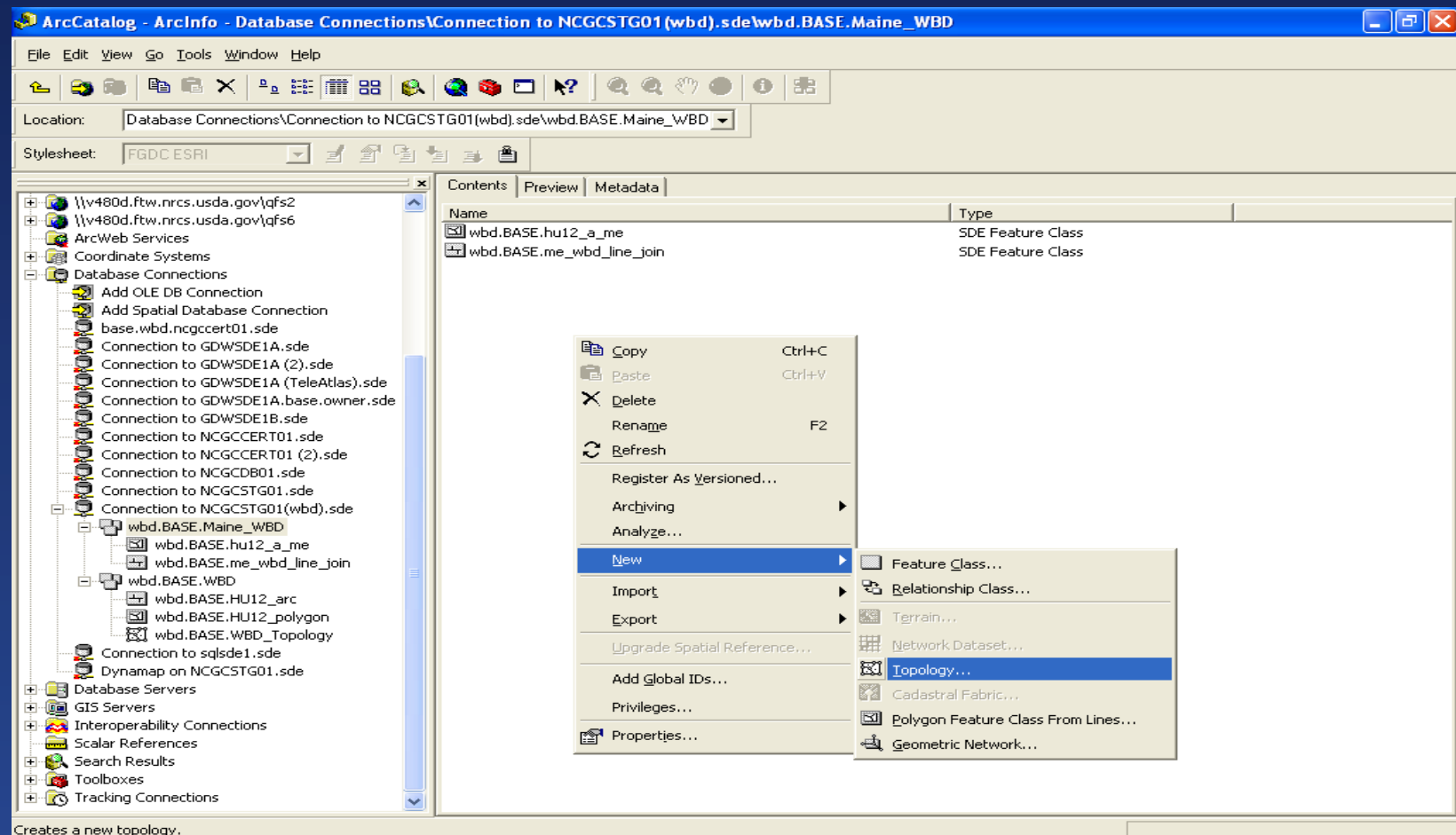
M Resolution: Unknown Units

Min: Max:

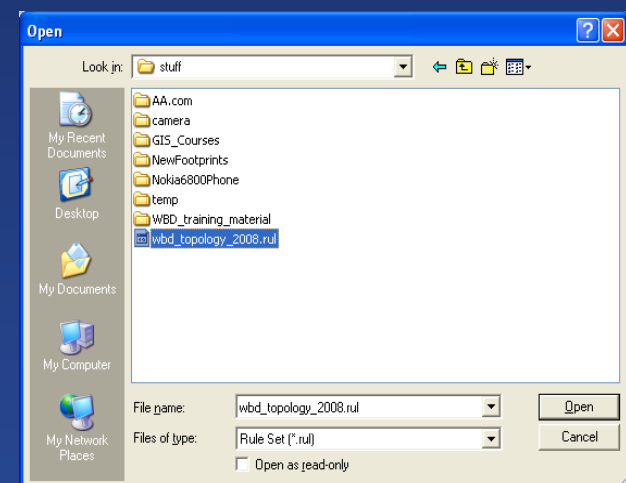
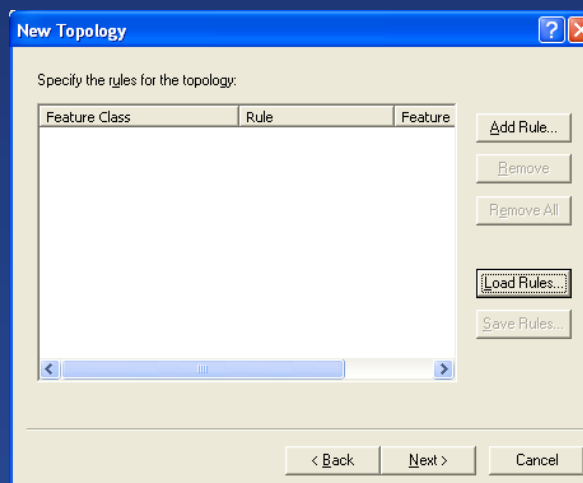
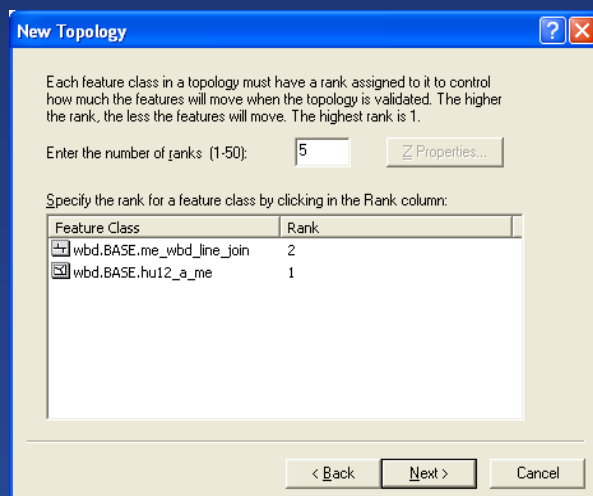
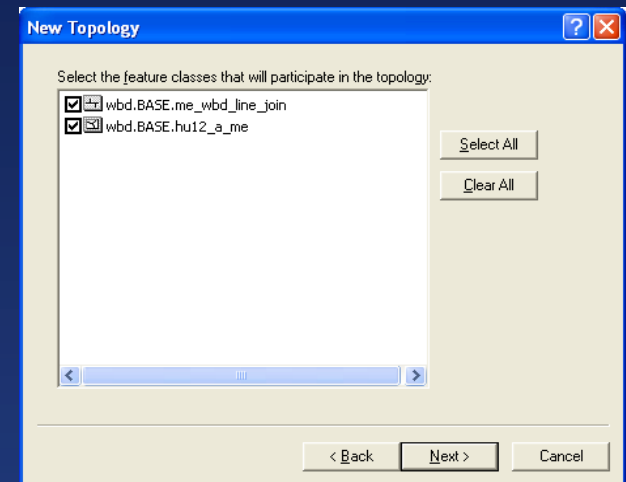
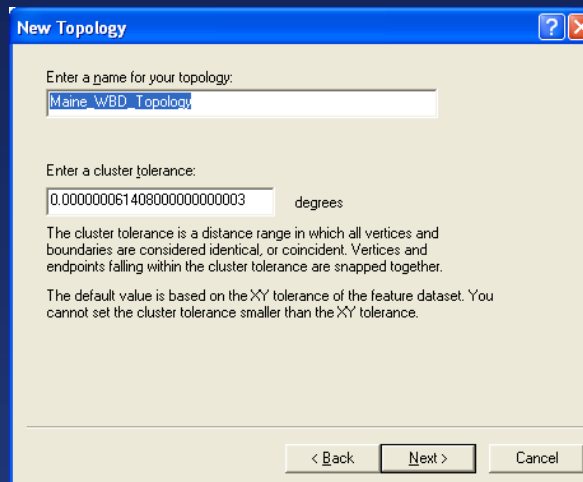
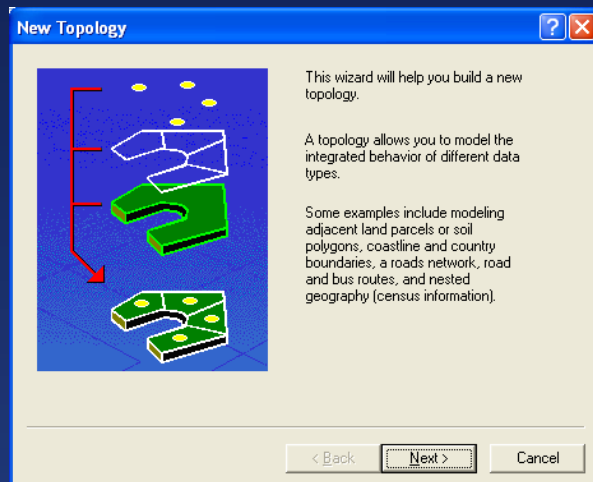
United States Department of Agriculture Natural Resources Conservation Service



Creating Topology in new dataset:



Creating Topology in new dataset (continued):



Creating Topology in new dataset (continued):

Load Rules

Rules to load:

Feature Class	Rule	Feature Class
HU12_arc	Must Be Covered B...	HU12_polygon
HU12_arc	Must Not Have Dan...	
HU12_arc	Must Not Self-Overlap	
HU12_arc	Must Not Self-Inter...	
HU12_arc	Must Not Have Pse...	
HU12_polygon	Must Not Overlap	

Each feature class from the rule set must be matched to a feature class in the target topology.

Specify the feature class by clicking in the Target column:

Source	Target
HU12_polygon	hu12_a_me
HU12_arc	me_wbd_line_join
	<not mapped>
	me_wbd_line_join

New Topology

Specify the rules for the topology:

Feature Class	Rule	Feature
wbd.BASE.me_wbd_line_join	Must Be Covered By...	wbd.BAS
wbd.BASE.me_wbd_line_join	Must Not Have Dan...	
wbd.BASE.me_wbd_line_join	Must Not Self-Overlap	
wbd.BASE.me_wbd_line_join	Must Not Self-Inter...	
wbd.BASE.me_wbd_line_join	Must Not Have Pseu...	
wbd.BASE.hu12_a_me	Must Not Overlap	
wbd.BASE.me_wbd_line_join	Must Not Overlap	
wbd.BASE.hu12_a_me	Must Not Have Gaps	
wbd.BASE.me_wbd_line_join	Must Not Intersect ...	
wbd.BASE.hu12_a_me	Boundary Must Be C...	wbd.BAS

< Back Next > Cancel

Configuration Keyword

Do you need to specify a configuration keyword?

A configuration keyword is used to specify storage and location parameters for optimal space and disk location efficiency. The configuration keyword is provided by your database administrator.

☒ No

This option uses the default storage parameters for the new topology.

☐ Yes

This option allows you to specify a configuration keyword for the new topology.

Configuration keyword:
TOPOLOGY_DEFAULTS

< Back Next > Cancel

New Topology

Summary:

Feature Classes:
wbd.BASE.me_wbd_line_join, Rank:2
wbd.BASE.hu12_a_me, Rank:1

Rules:
wbd.BASE.me_wbd_line_join - Must Be Covered By Boundary Of - wbd.B
wbd.BASE.me_wbd_line_join - Must Not Have Dangles
wbd.BASE.me_wbd_line_join - Must Not Self-Overlap
wbd.BASE.me_wbd_line_join - Must Not Self-Intersect
wbd.BASE.me_wbd_line_join - Must Not Have Pseudos
wbd.BASE.hu12_a_me - Must Not Overlap
wbd.BASE.me_wbd_line_join - Must Not Overlap
wbd.BASE.hu12_a_me - Must Not Have Gaps
wbd.BASE.me_wbd_line_join - Must Not Intersect Or Touch Interior
wbd.BASE.hu12_a_me - Boundary Must Be Covered By - wbd.BASE.me

< Back Finish Cancel

New Topology

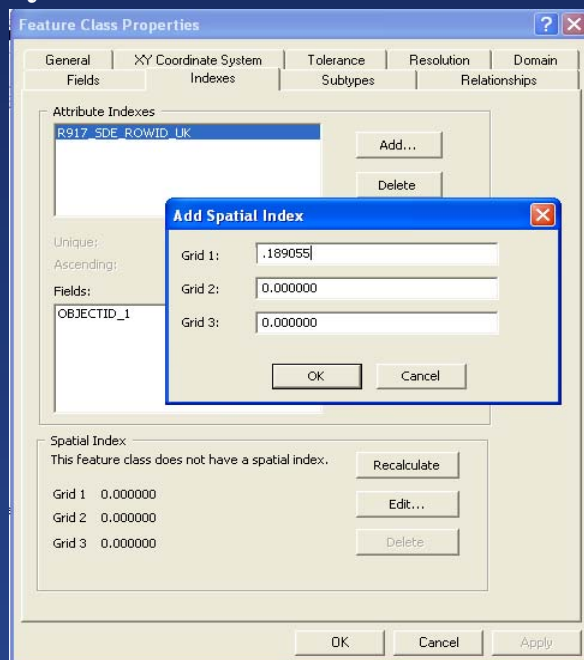
The new topology has been created. Would you like to validate it now?

Yes No

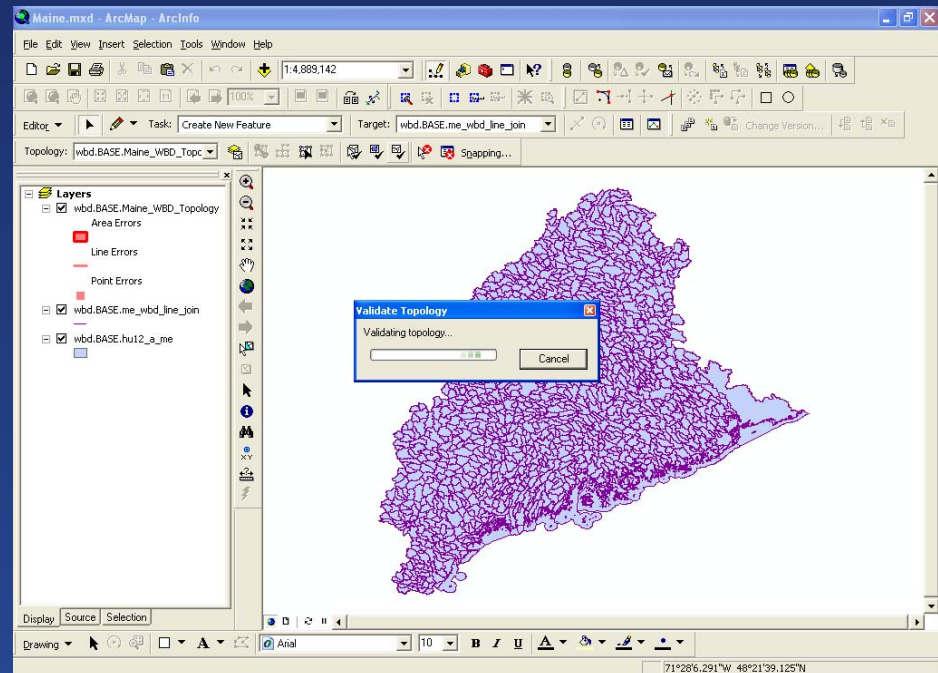
Validating Topology is faster in ArcMap, so click “No” here, then open ArcMap and pull in new Geodatabase to validate; but first, while still in ArcCatalog, be sure to “Register As Versioned” the new geodatabase; also ensure there is a Spatial Index for each layer.

Validate Topology

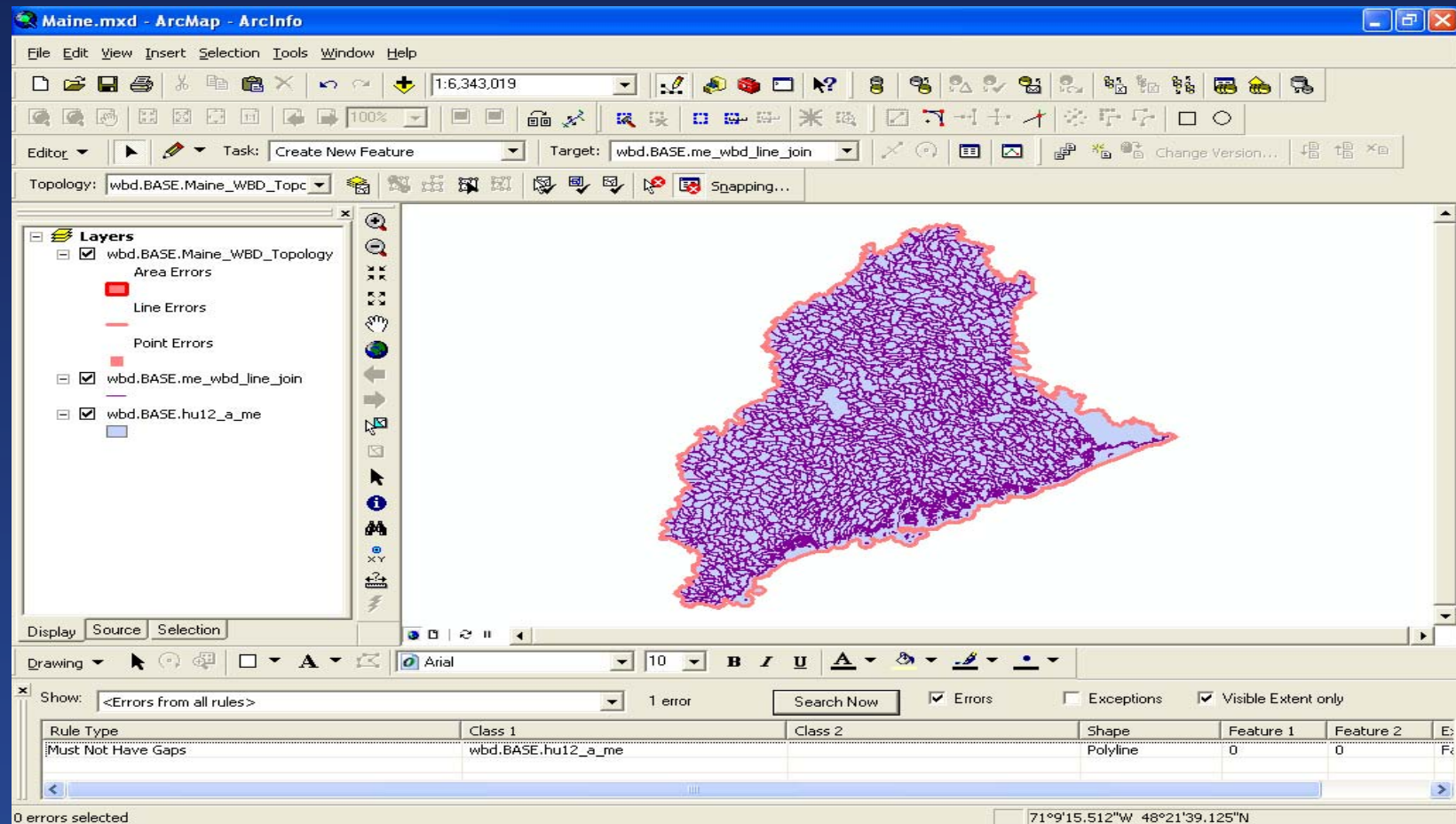
In ArcCatalog, right click the Geodatabase and select “Register As Versioned”, then Right click each layer in the Geodatabase to create a Spatial Index based on the Spatial Index of the National SDE layers:



Now, the geodatabase is ready to be Validated in ArcMap using the Topology Toolbar (Edit Session must be started):



Validating Topology results in only one error, but this Gap Error is not really an error since it is for the outer extent.



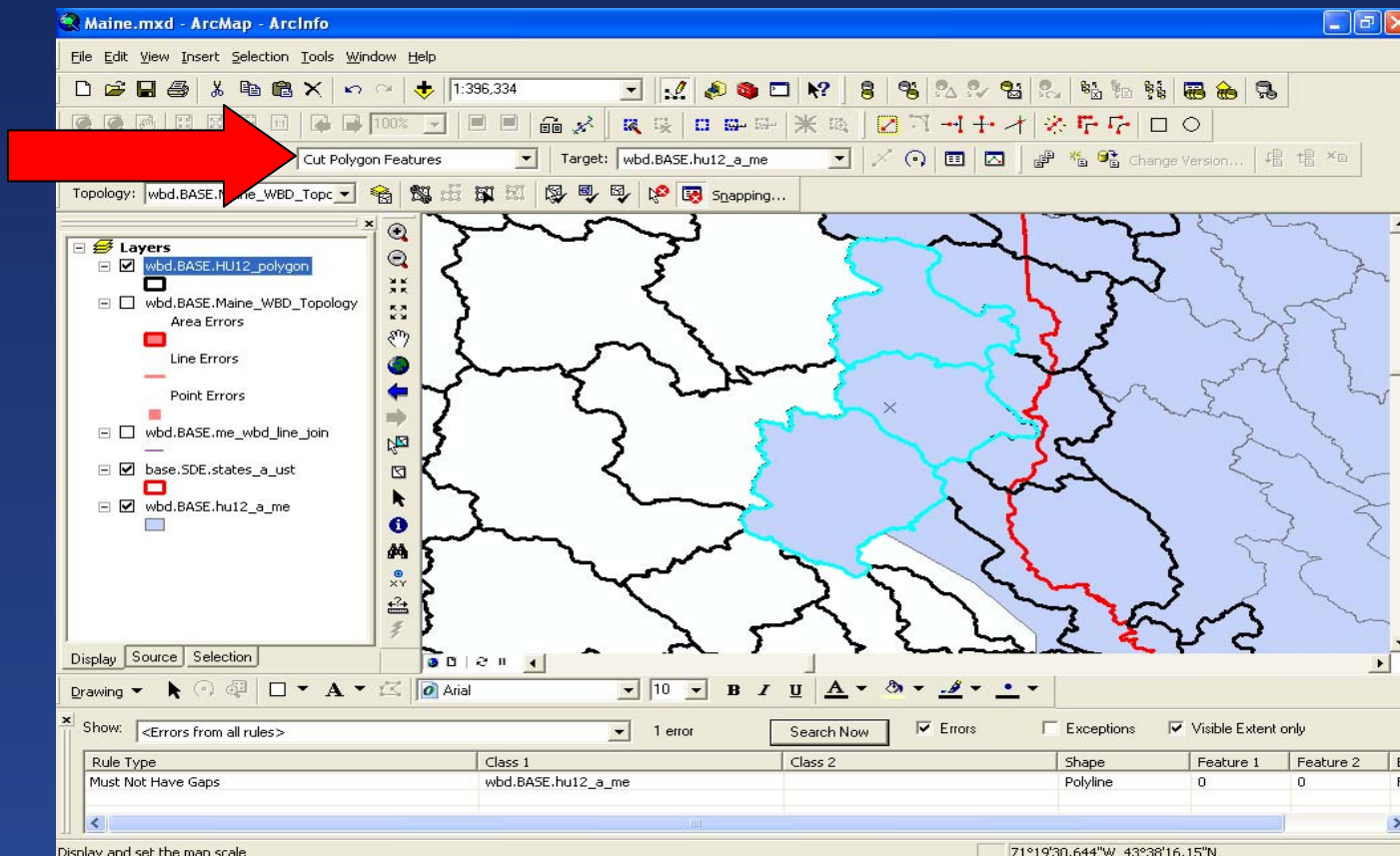
Clipping

As stated earlier, it was agreed that Maine's dataset will extend roughly a depth of two HUC12 polygons in to New Hampshire in order to integrate some linework edits that went beyond the Maine's state boundary, but to ensure that there are the least amount of topology errors when merging the polygon boundaries, do the following:

- Maine's HUC12 polygons at its agreed upon outer edge will be manually clipped in half that will be merged to New Hampshire.
- a new Check-Out of the New Hampshire border polygons will be created.
- New Hampshire's layers will be clipped with the revised clipped Maine polygon layer.
- Maine's linework will be clipped by the new NH polygon clipped layer.
- Maine's new layers will be imported into the SDE Check-Out.
- The corresponding HUC12 polygons will be merged, and all polygon and linework Topology errors will be corrected.

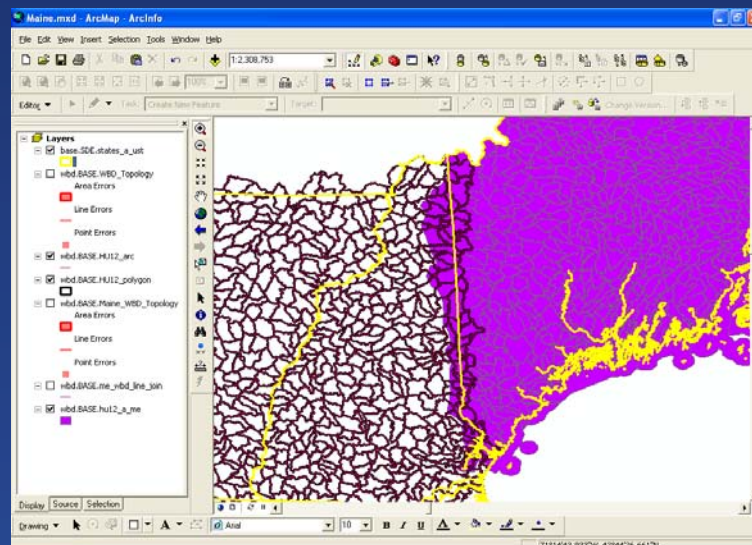
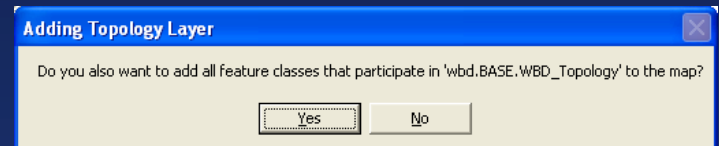
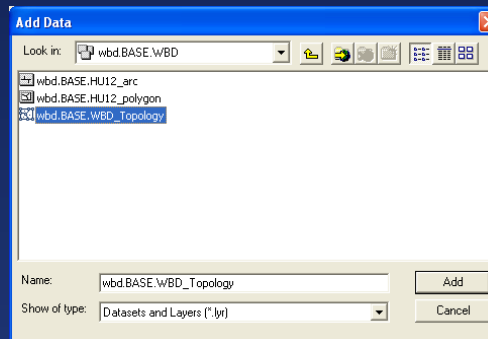
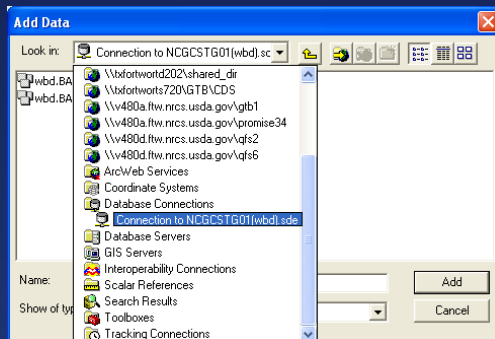
Clipping new state dataset's HUC 12 polygons in half to merge later; this method alleviates thousands of sliver and overlap errors that would occur if just replacing polygons. Where the datasets' overlapping polygons should be identical, they never are due to dataset tolerance level differences or other anomalies.

Cut
Polygon
Features



Creating SDE Replica (Check-Out)

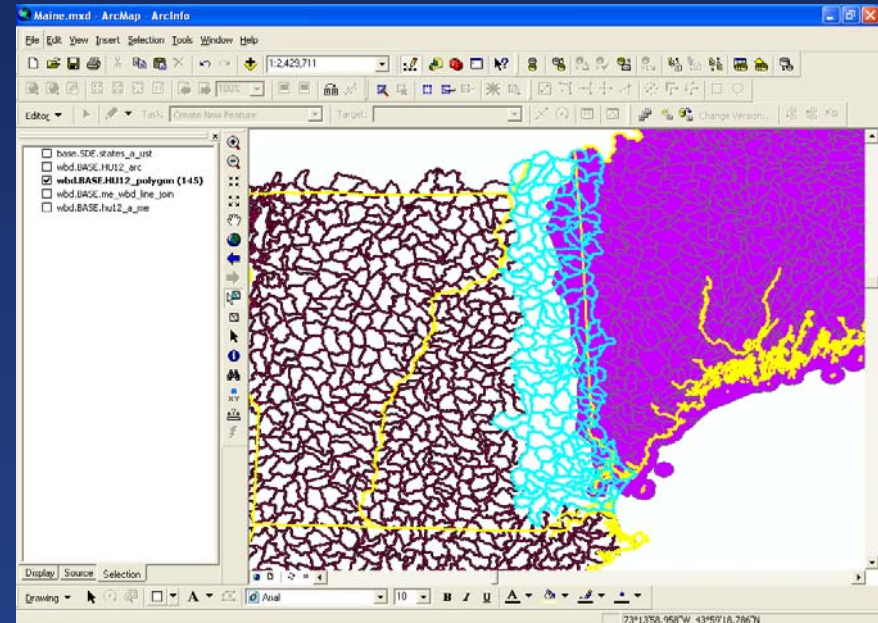
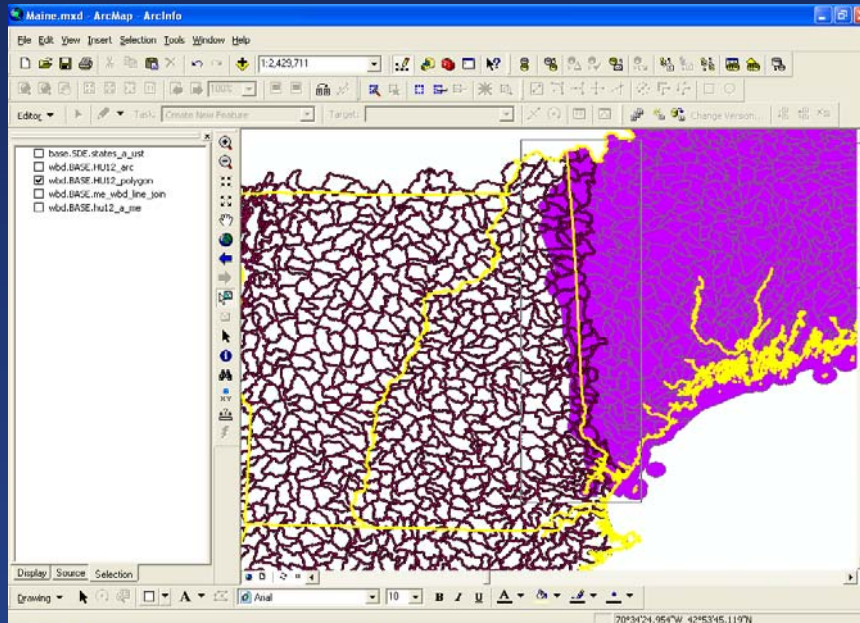
Add SDE layer to ArcMap that will have the new state integrated:

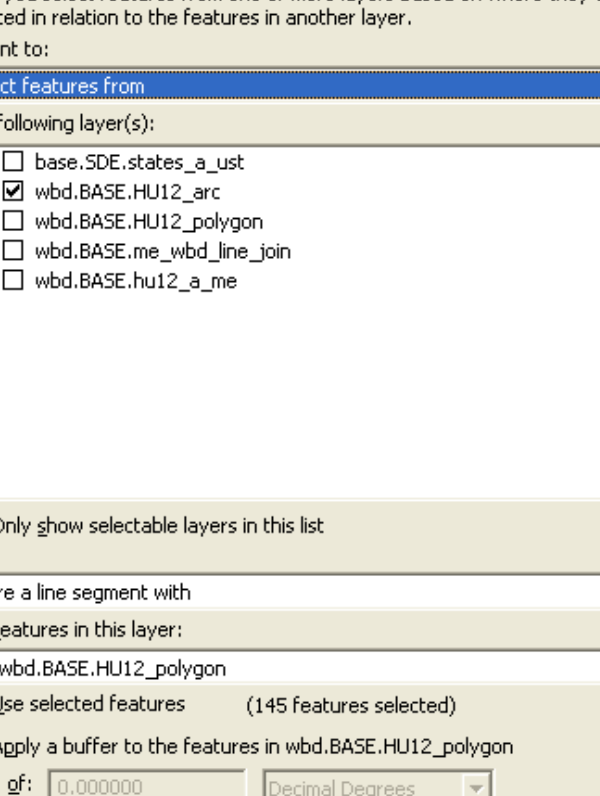


Ensure the only selectable layer is the SDE polygon layer:

- ☐ base.SDE.states_a_ust
- ☐ wbd.BASE.HU12_arc
- ☒ wbd.BASE.HU12_polygon
- ☐ wbd.BASE.me_wbd_line_join
- ☐ wbd.BASE.hu12_a_me

Ensure that you are NOT in an edit session and draw a rubber band selection box around polygons at NH/ME state border that will be edited in a “Check-Out” session later.





Select By Location

Lets you select features from one or more layers based on where they are located in relation to the features in another layer.

I want to:

select features from

the following layer(s):


- ☐ base.SDE.states_a_ust
- ☒ wbd.BASE.HU12_arc
- ☐ wbd.BASE.HU12_polygon
- ☐ wbd.BASE.me_wbd_line_join
- ☐ wbd.BASE.hu12_a_me

☐ Only show selectable layers in this list

that:

share a line segment with

the features in this layer:

 wbd.BASE.HU12_polygon

☒ Use selected features (145 features selected)

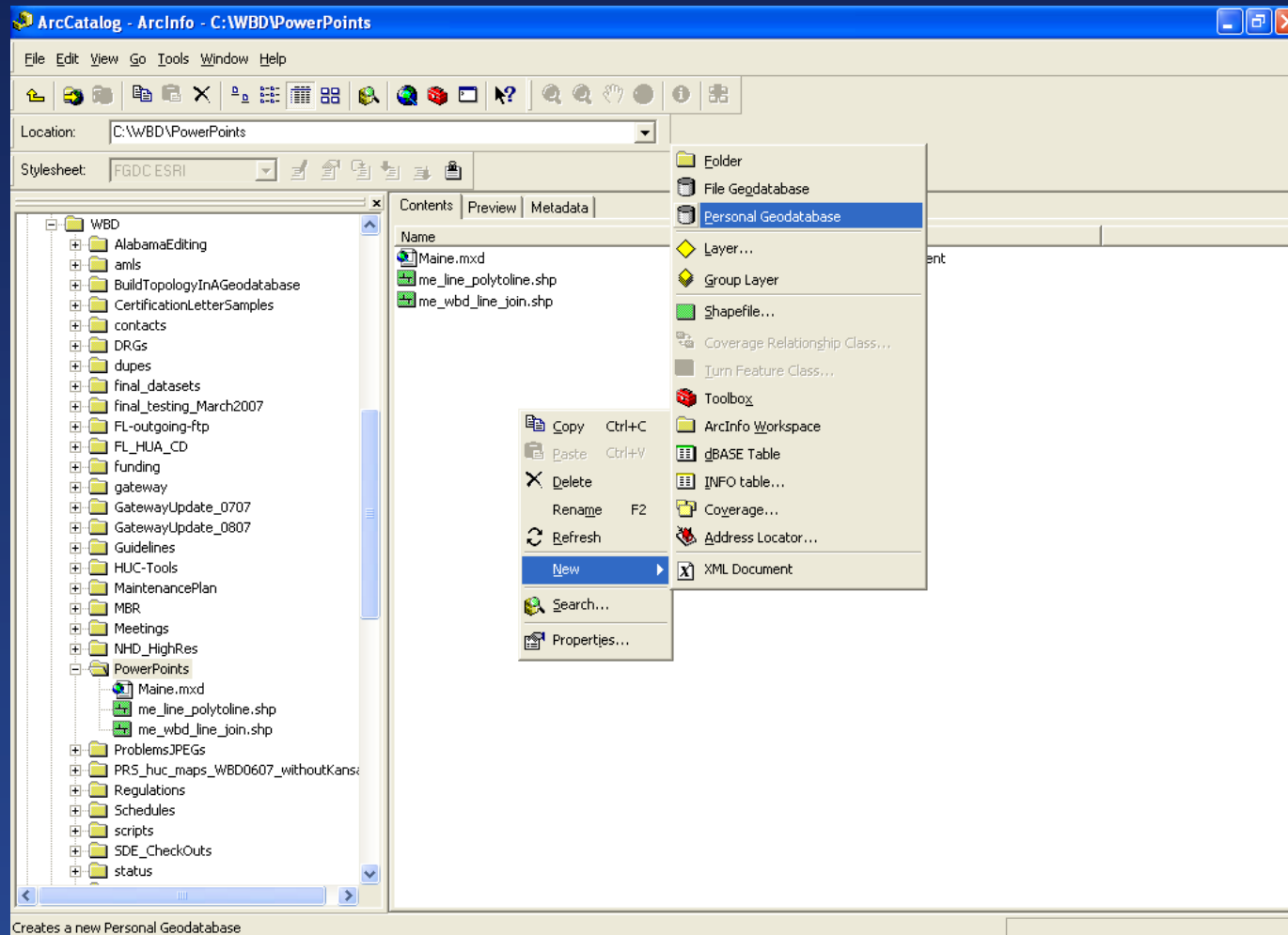
☐ Apply a buffer to the features in wbd.BASE.HU12_polygon

of: 0.000000 Decimal Degrees

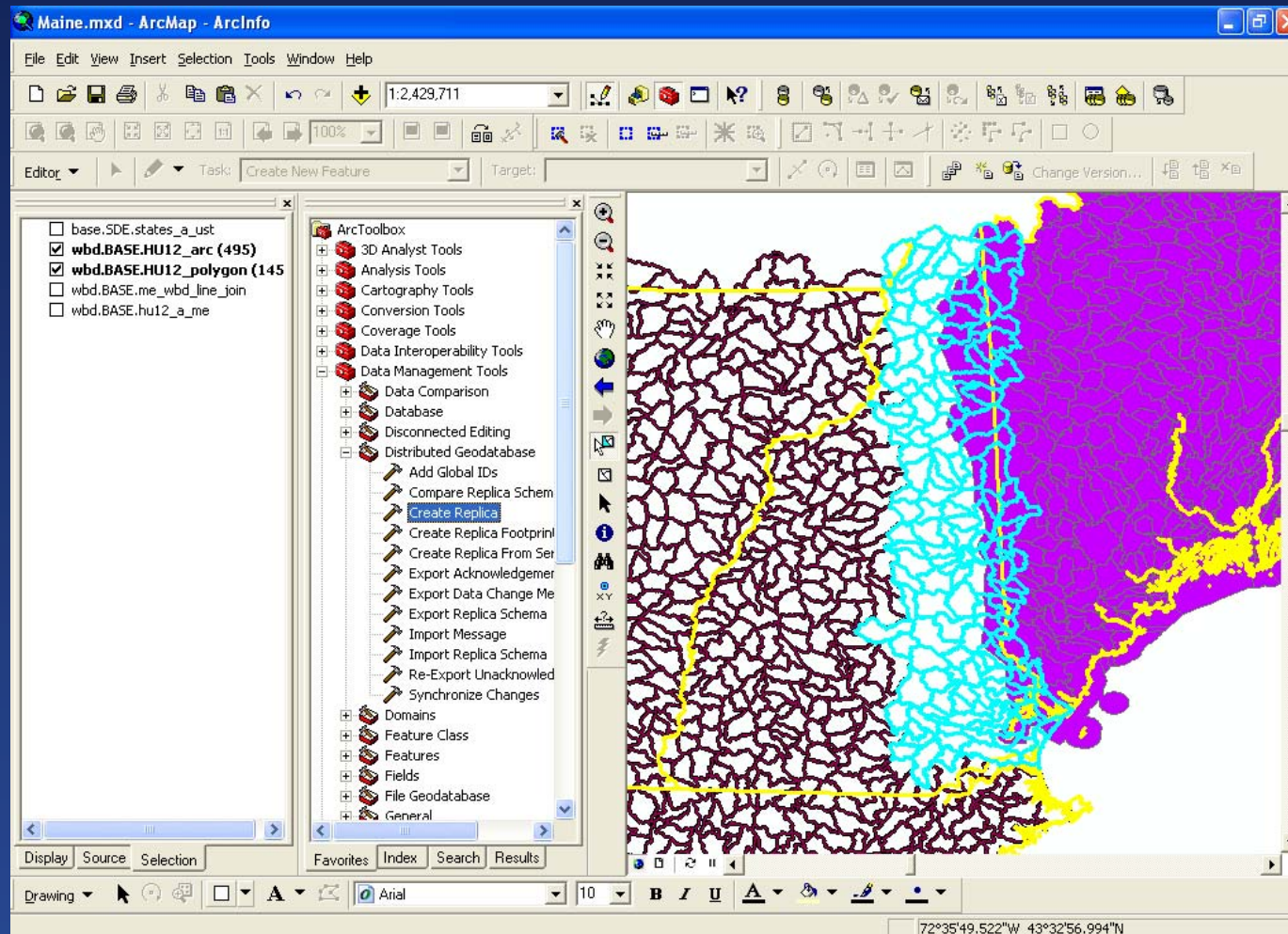
Help OK Apply Close

☐ base.SDE.states_a_ust
☒ **wbd.BASE.HU12_arc (495)**
☒ **wbd.BASE.HU12_polygon (145)**
☐ wbd.BASE.me_wbd_line_join
☐ wbd.BASE.hu12_a_me

If you don't already have a new Personal Geodatabase to put the Check-Out, create one in ArcCatalog and call it anything appropriate to the project:



With both SDE polygons and associated arcs now selected at the NH/ME border, you now create the Replica (Check-Out) of the area using the “Create Replica” too in ArcToolbox:



Select the polygon and
arc SDE layers that have
the proper data selected:

Pick the Replica Type
“CHECK_OUT” and the
location of the database
where you will put it:

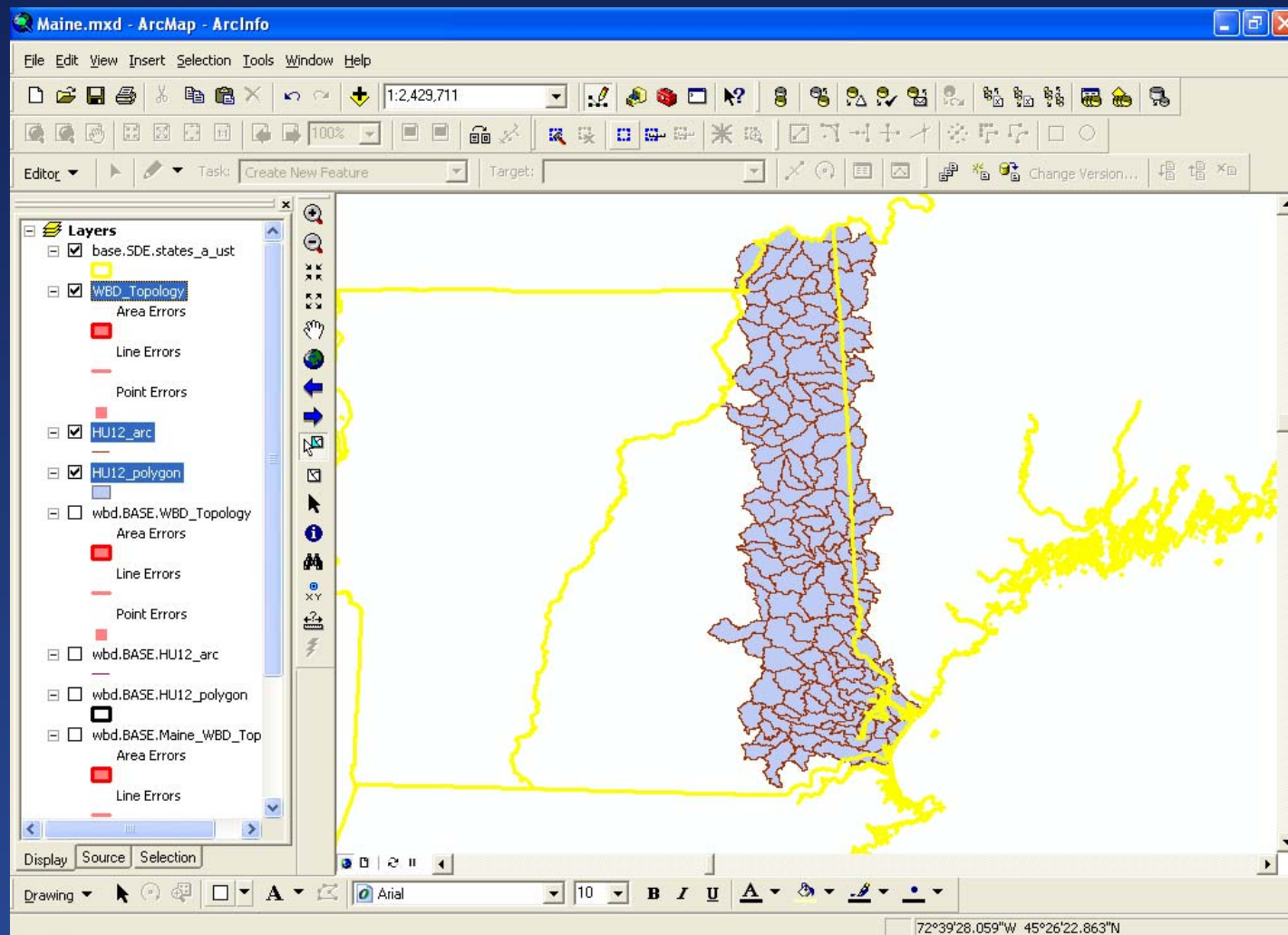
Give it a Replica Name:

The screenshot shows the 'Create Replica' dialog box with the following fields and values:

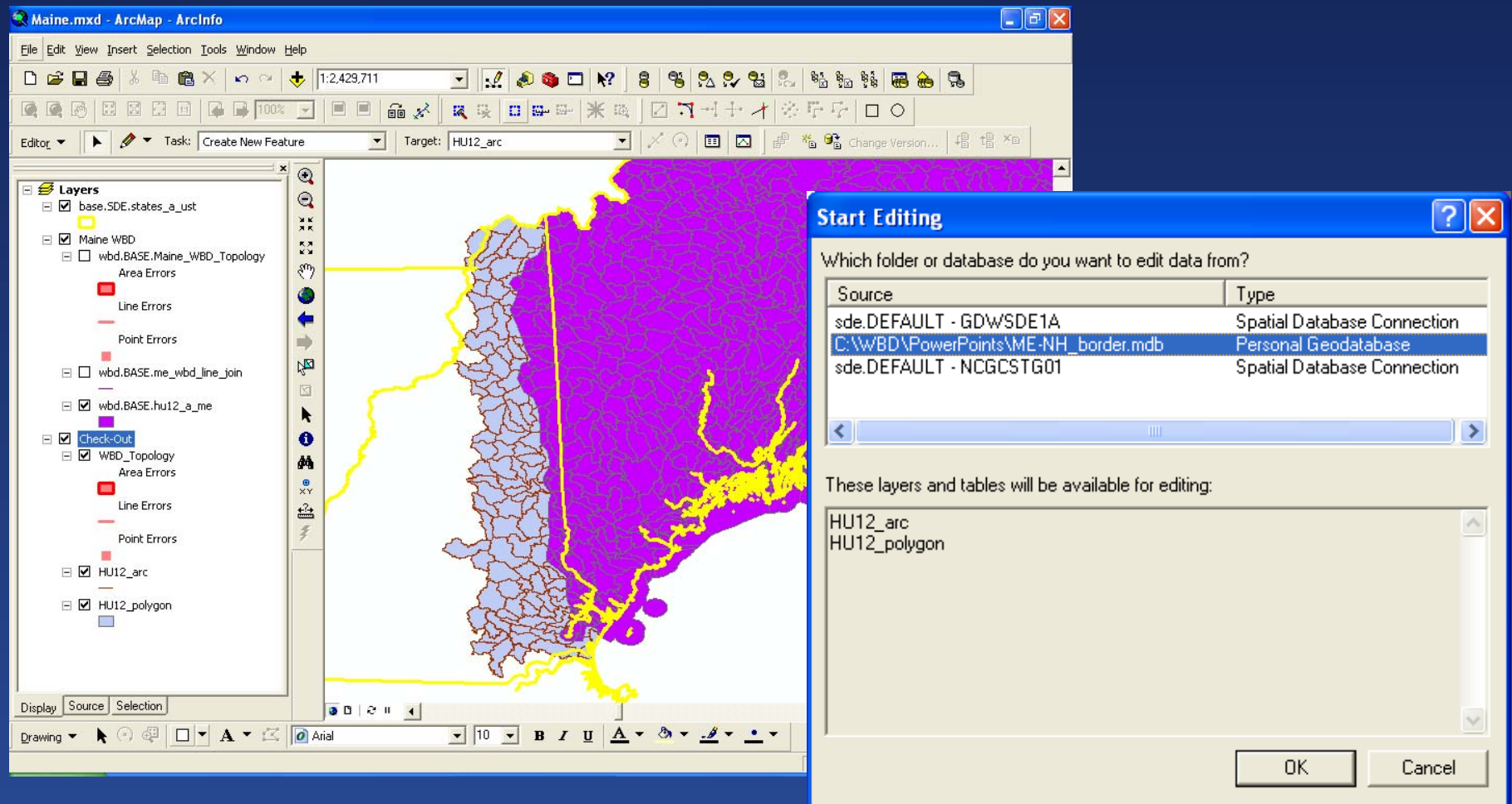
- Replica Datasets:** A list box containing 'wbd.BASE.HU12_polygon' and 'wbd.BASE.HU12_arc'. Two red arrows point to this list.
- Replica Type:** A dropdown menu set to 'CHECK_OUT'. A red arrow points to this dropdown.
- Geodatabase to replicate data to:** A text field containing 'C:\WBD\PowerPoints\ME-NH_border.mdb'. A red arrow points to this field.
- Replica Name:** A text field containing 'MaineNewHampshire'. A red arrow points to this field.
- Advanced Setting:** A collapsed section at the bottom.

At the bottom of the dialog are buttons for 'OK', 'Cancel', 'Environments...', and '<< Hide Help'. A 'Help' tab is visible on the right side of the dialog.

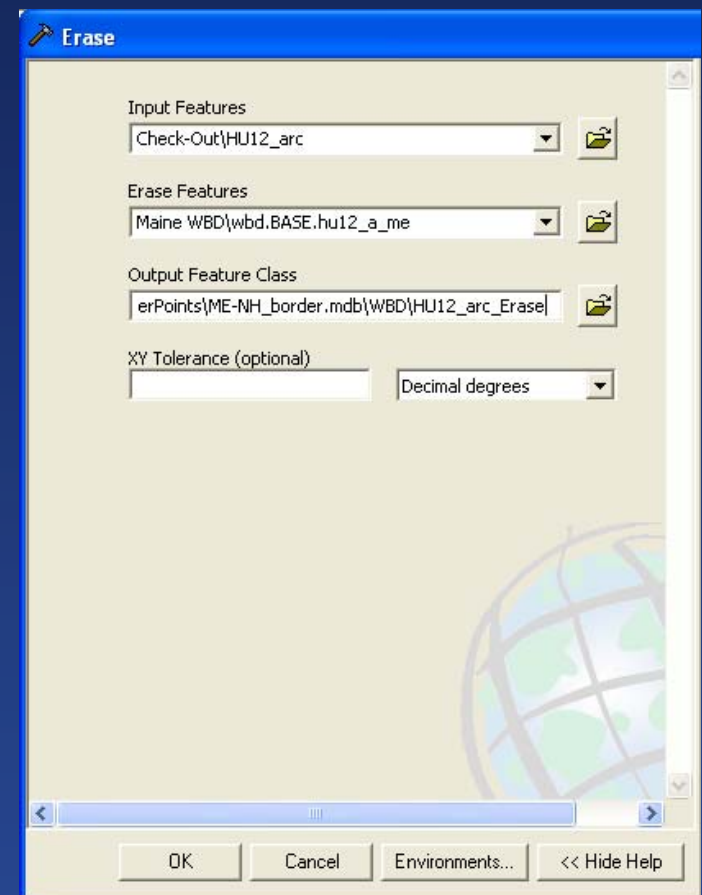
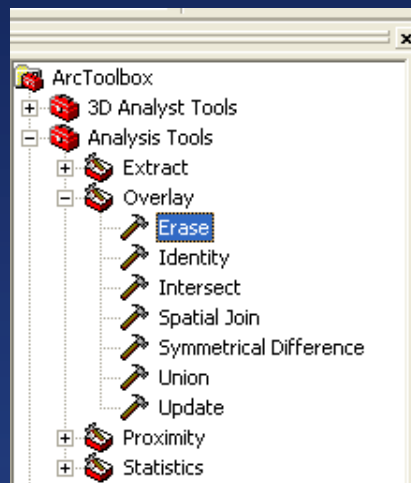
The resulting “Check-Out” is a subset of the polygons and arcs as well as Topology that are checked out to the appropriate geodatabase.



Remove the original SDE layers from ArcMap and only have the Check-Out layers and the dataset to integrate (Maine in this case) in your session. Start an edit session to edit the Check-Out layers.



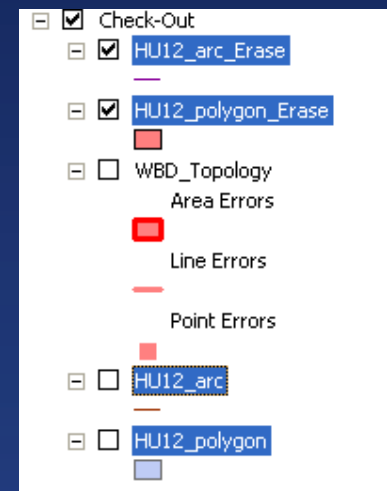
Open ArcToolbox and use the “Erase” tool to clip out the area of the Check-Out polygons, then arcs that are overlapped by Maine’s previously clipped HUC12 polygon boundaries:



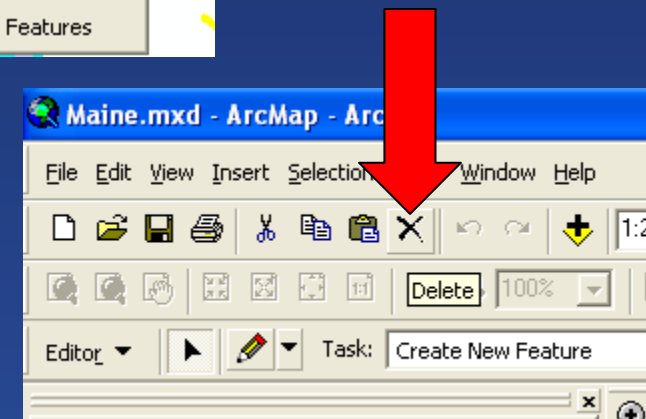
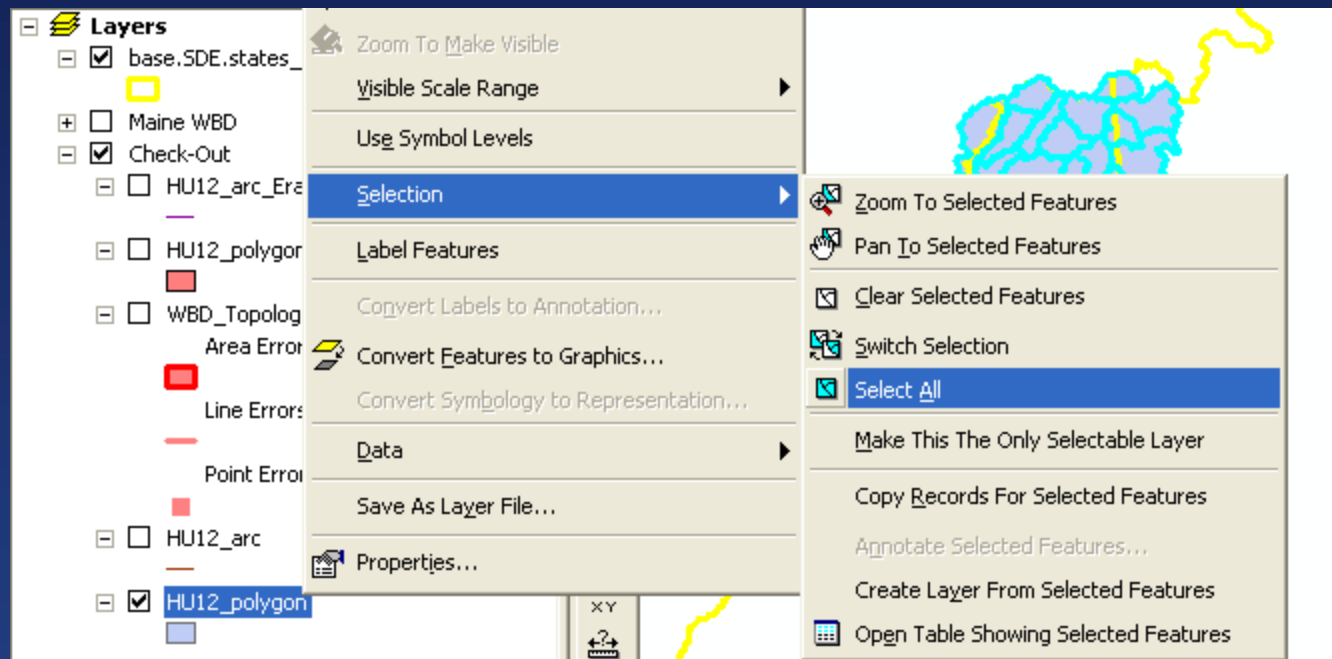
Next, erase Maine's latest linework with the polygon_erase from the Check-Out, so that all layers will align as closely as possible:



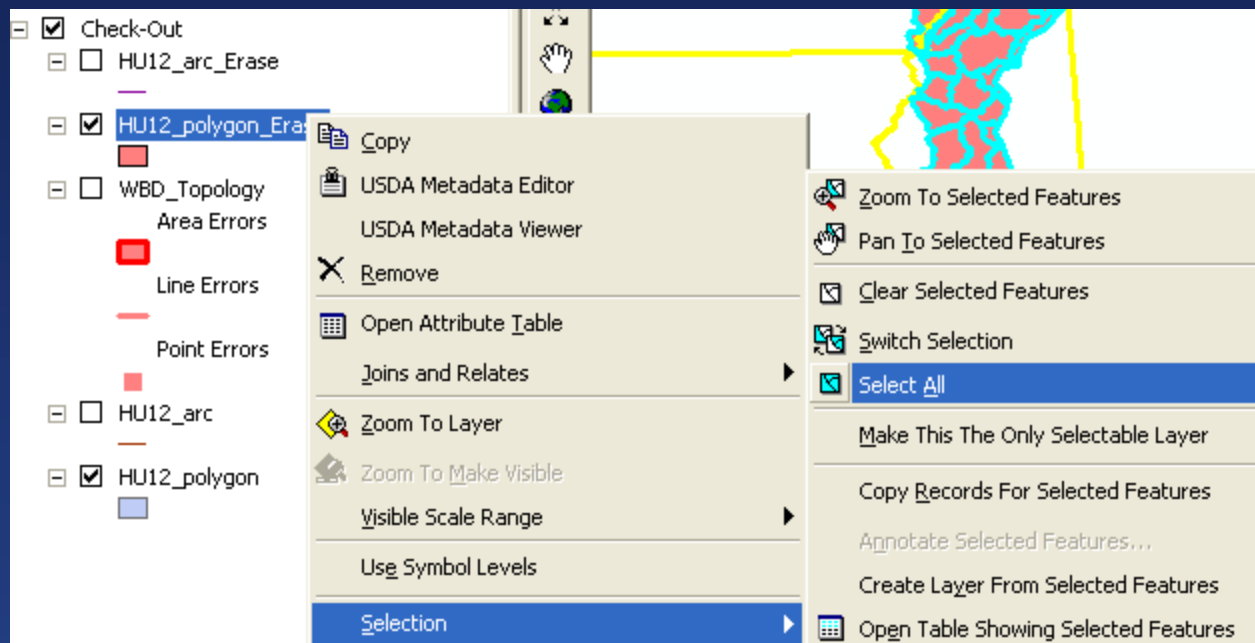
In the next steps, the two “Erase” layers of the Check-Out will need to have all features replace those of the original Check-Out layers:



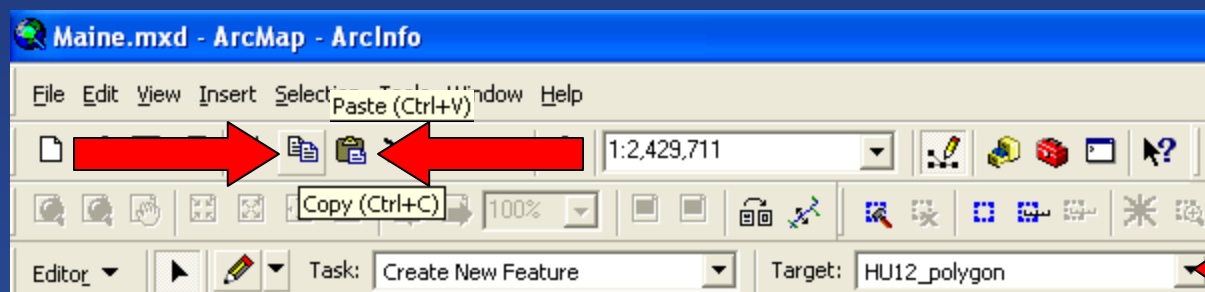
While still in an edit session for the Check-Out layers, select all original polygons, then erase them.



Next select all of the the new “polygon_erase” Check-Out layer polygons,
and copy and paste them to the original Check-Out polygon layer:

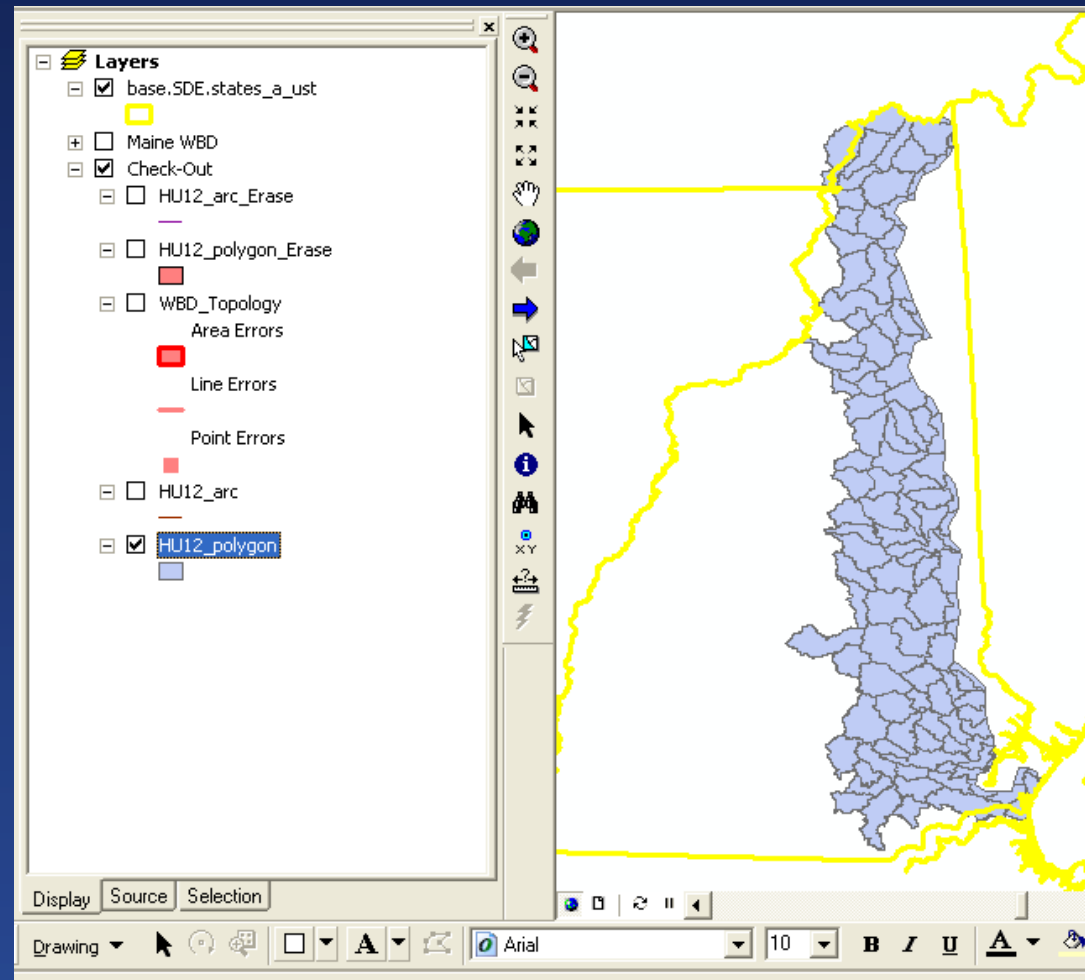


Ensuring the
proper
target layer,
do a copy
and paste:

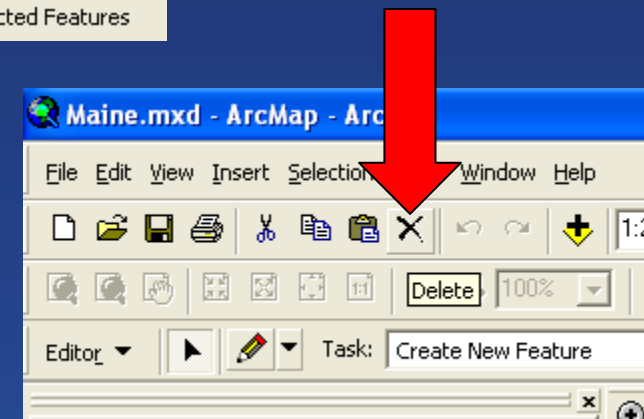
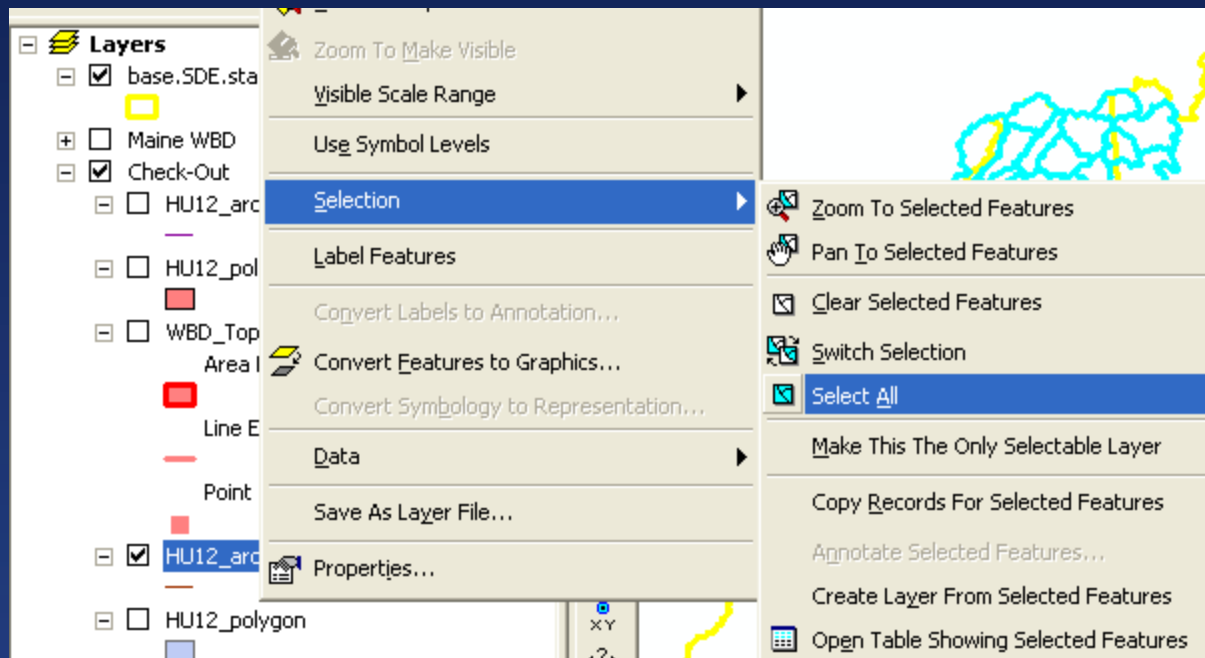


Ensure proper
Target layer
here:

Be sure and do a “Save Edits” at this point. The result so far is the original polygon layer from the Check-Out having the clipped polygons.



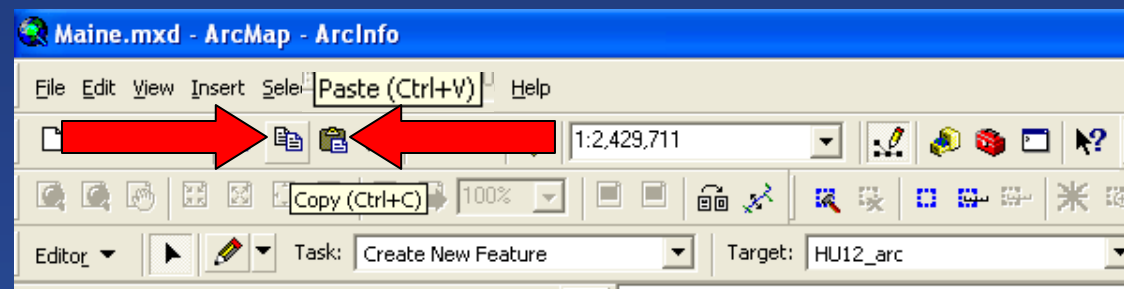
Next, do the same erase, copy and paste for the Check-Out arcs.



Next select all of the the new “polygon_erase” Check-Out layer arcs, and copy and paste them to the original Check-Out arc layer:

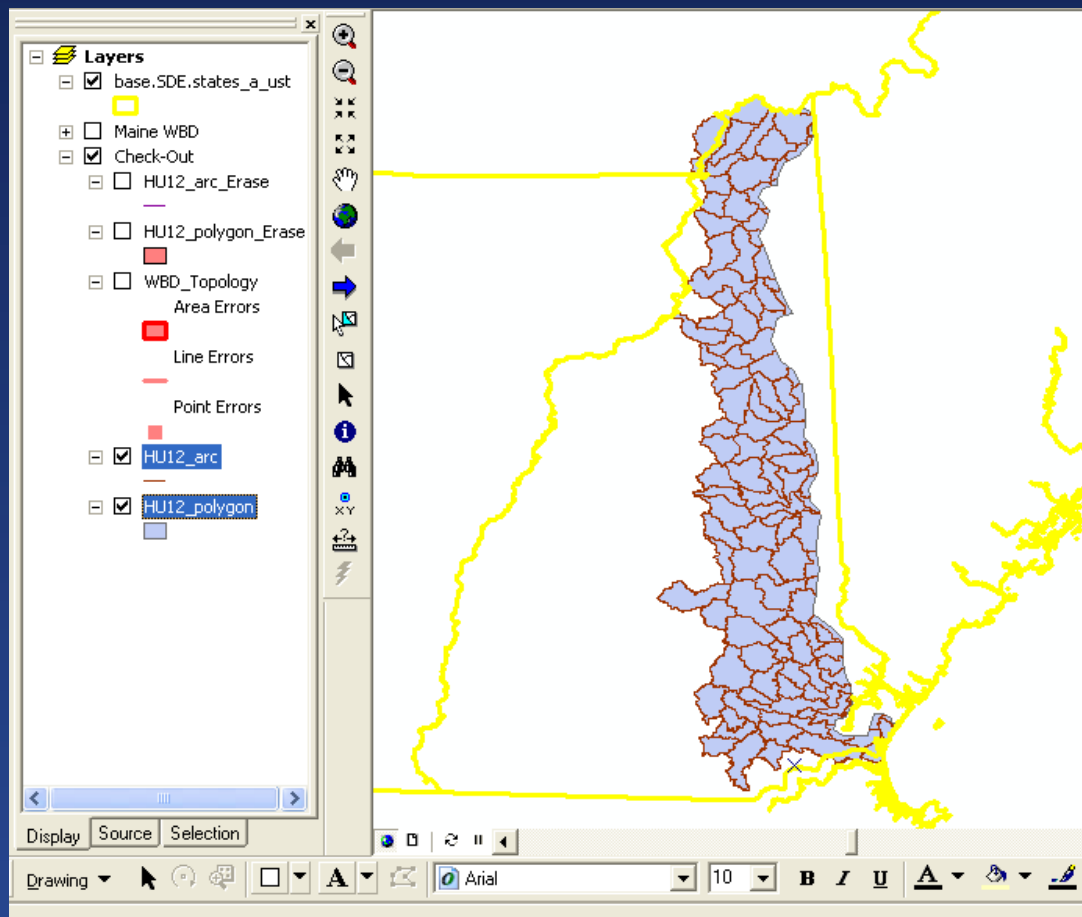


Ensuring the proper target layer, do a copy and paste:



Ensure proper Target layer here:

Again, be sure and do a “Save Edits” at this point. The result now is both the original polygon and the original arc layers from the Check-Out having the proper clipped features.

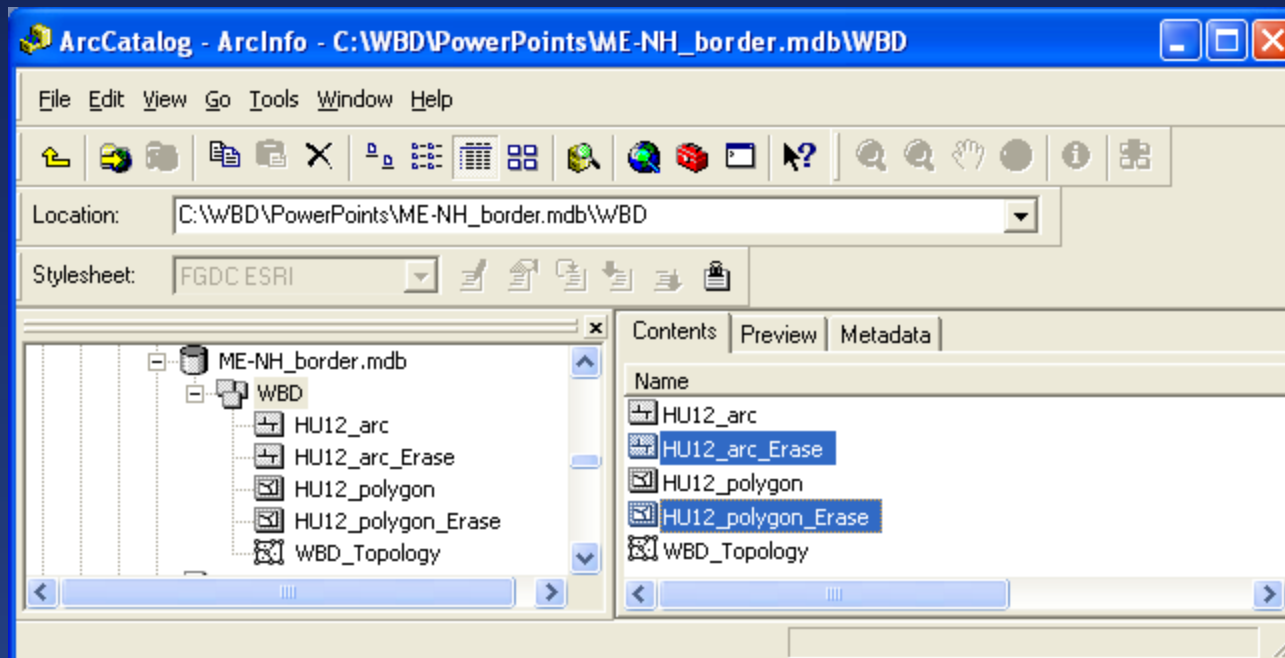


Stop the edit session.

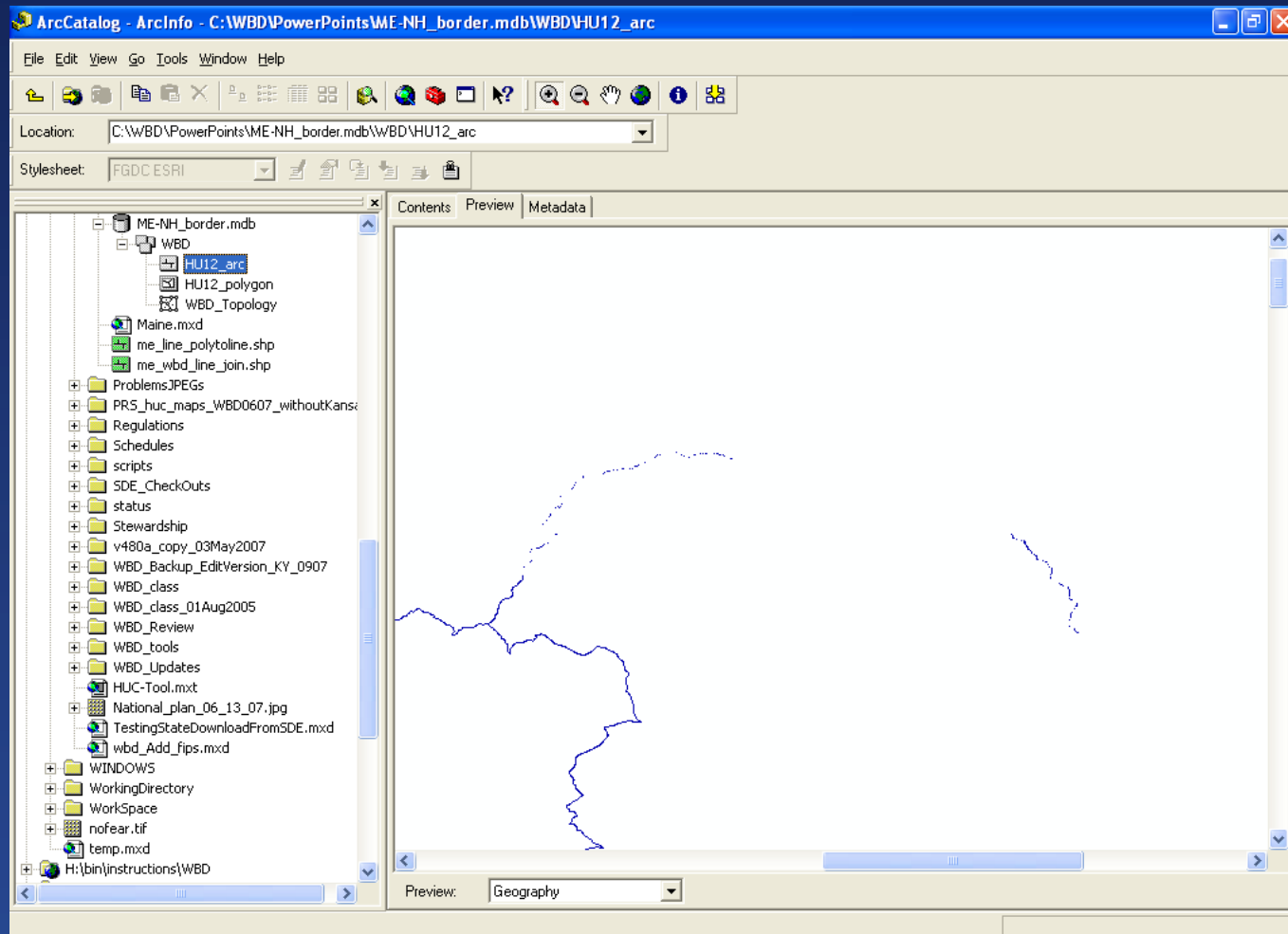
Close ArcMap.

Open ArcCatalog to Import the Maine's datasets into the Check-Out geodatabase.

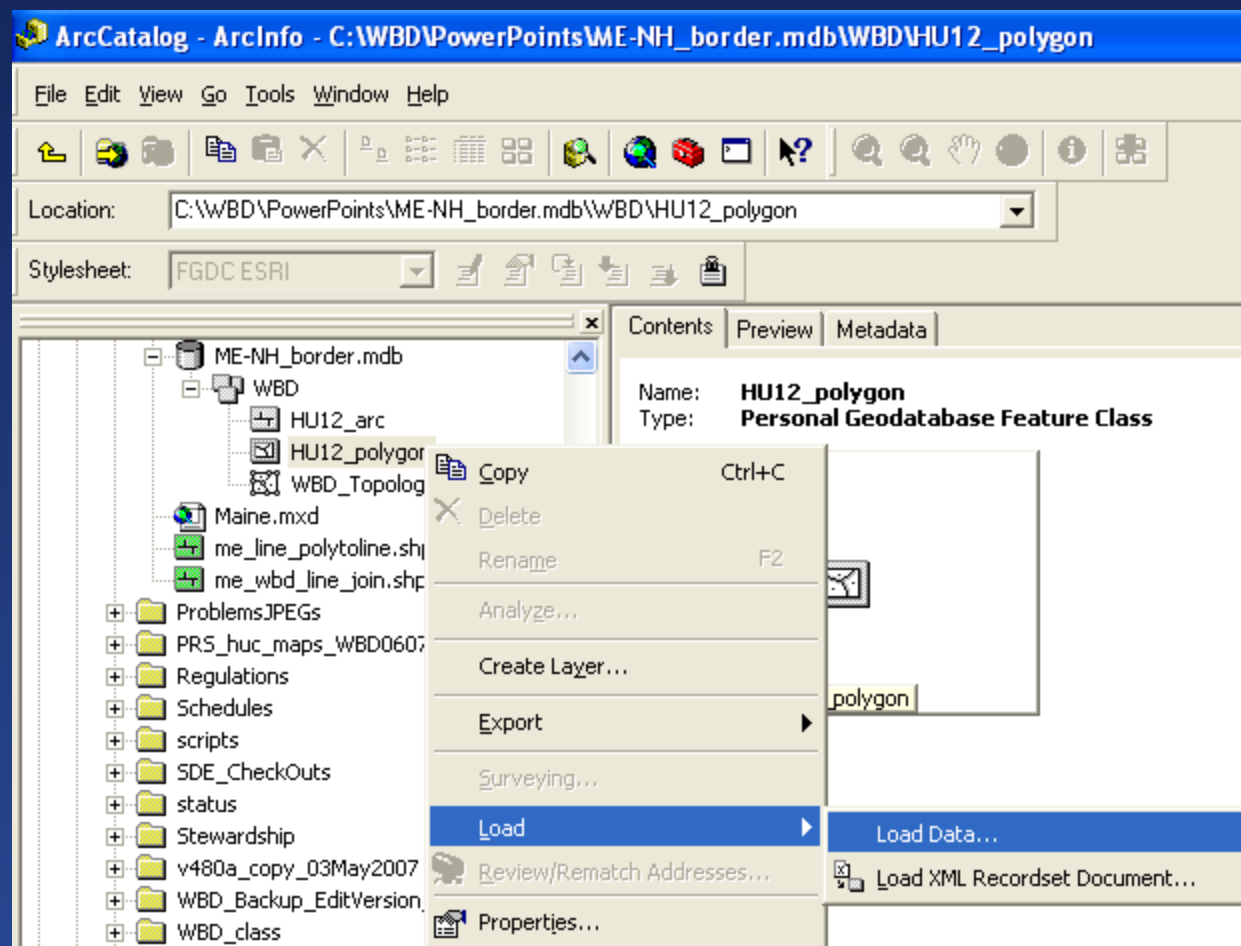
The “Erase” layers are no longer needed, so delete these first before doing the data Import:



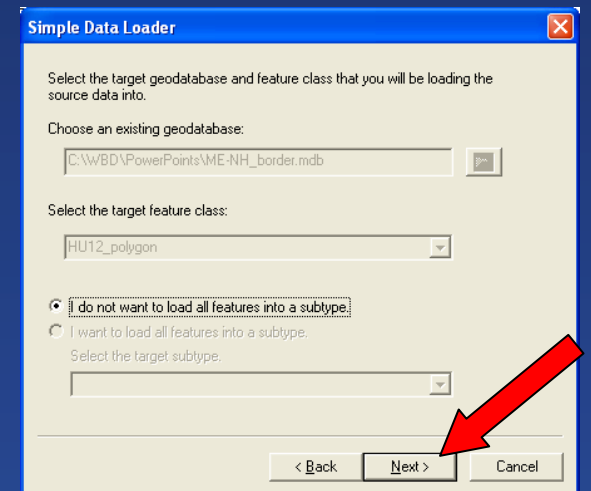
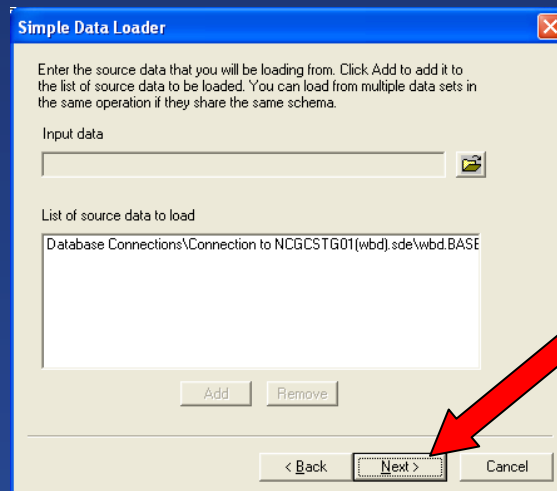
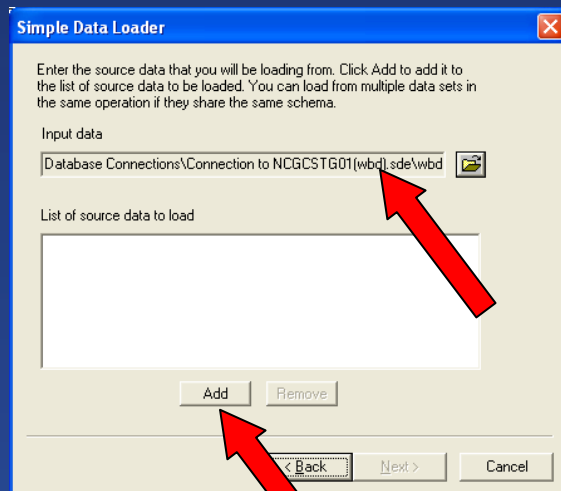
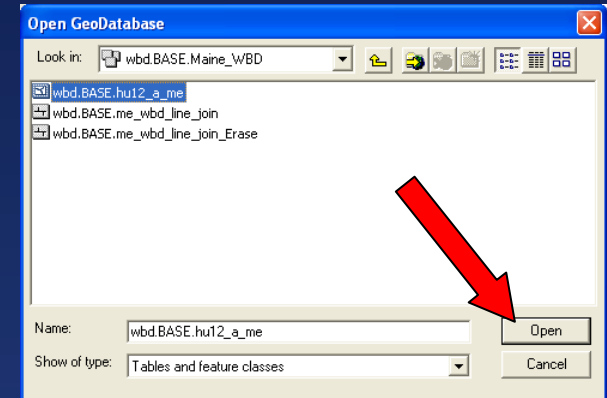
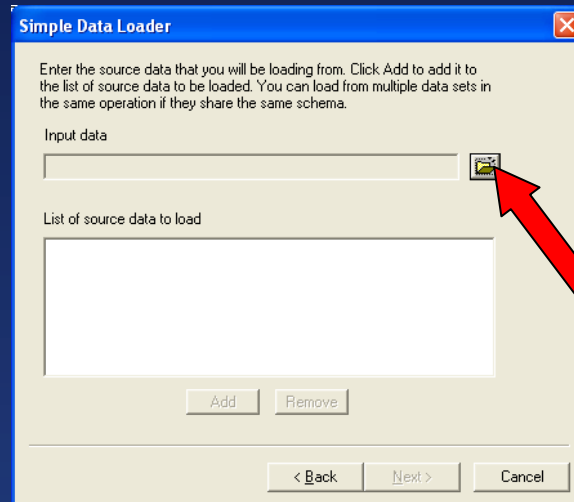
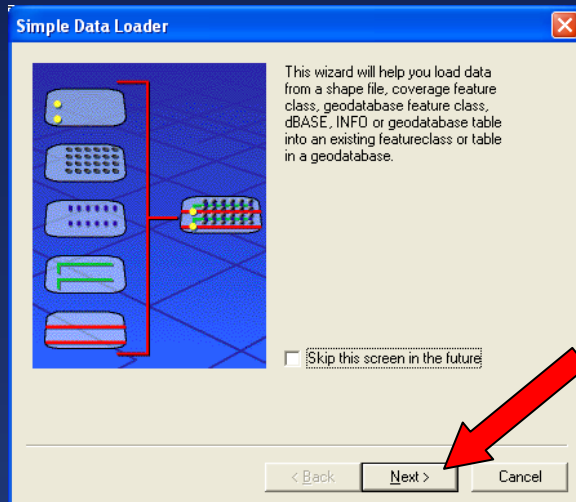
Before doing the data import, you may want to go back in to ArcMap and delete out any extraneous features that you know were errors that occurred during the erase.



Once data layers of the Check-Out are cleaned up, in ArcCatalog, right-click the HU12_polygon layer in your Check-Out, and select “Load”, then “Load Data...”



...and browse to the location where the updated Maine
polygons reside that were clipped in an earlier step.




On the next screen, ensure that all Target fields have a Matching Source Field. You will likely need to update the “States” field because the SDE layer column heading is different than that of the new dataset.

Simple Data Loader

For each target field, select the source field that should be loaded into it.

Target Field	Matching Source Field
HU_10_MOD [string]	HU_10_MOD [string]
HU_10_TYPE [string]	HU_10_TYPE [string]
HU_12_DS [string]	HU_12_DS [string]
HU_12_NAME [string]	HU_12_NAME [string]
HU_12_MOD [string]	HU_12_MOD [string]
HU_12_TYPE [string]	HU_12_TYPE [string]
HU_12_STATES [string]	<None>
META_ID [string]	<None>
NCGC_EDITS [string]	HUC_8 [string]
	HUC_10 [string]
	HUC_12 [string]
	ACRES [double]
	STATES [string]
	NCONTRB_A [double]
	HU_10_DS [string]
	HU_10_NAME [string]
	HU_10_MOD [string]
	HU_10_TYPE [string]
	HU_12_DS [string]




Simple Data Loader

You can load all of the features from your source data into the target feature class or you can limit what is loaded by defining an attribute query.

☒ Load all of the source data

☐ Load only the features that satisfy a query

[Query Builder...](#)



< Back **Next >** Cancel

Simple Data Loader

Summary


Summary for data load operation

Source data: Database Connections\Connection to NCGCSTG01(wbd).sde\wbd.BASE.Maine_WBD\wbd.BASE.hu12_a_me

Target geodatabase: C:\wbd\PowerPoints\ME-NH_border.mdb

Target feature class: HU12_polygon

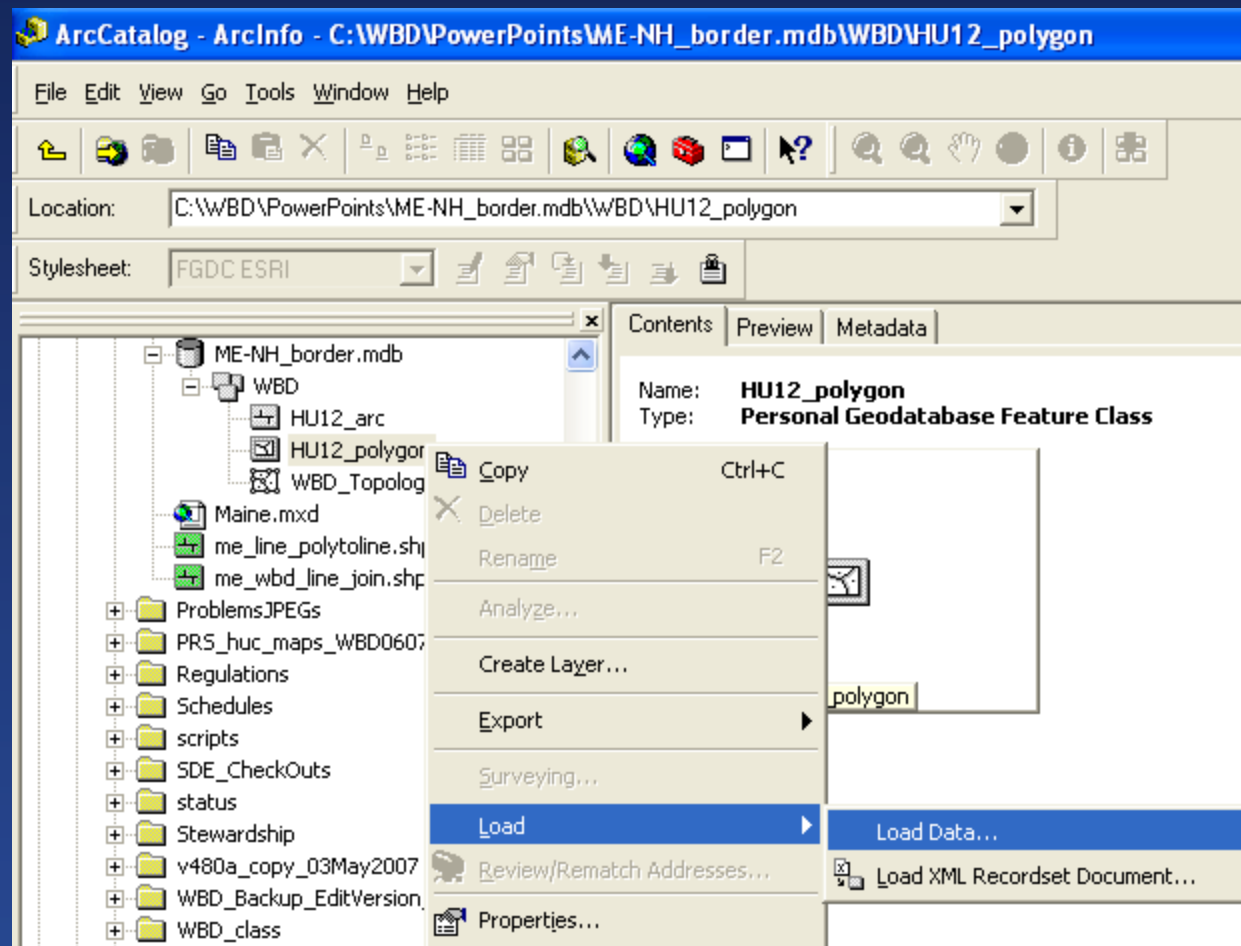
Query:



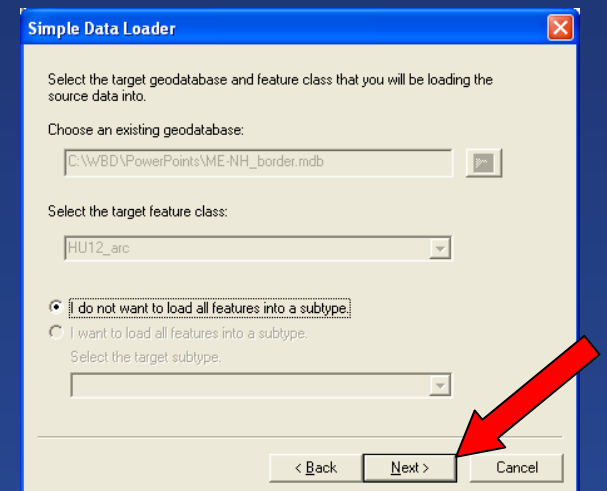
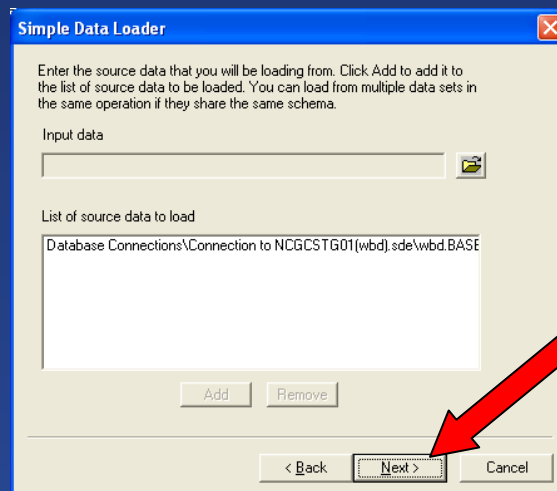
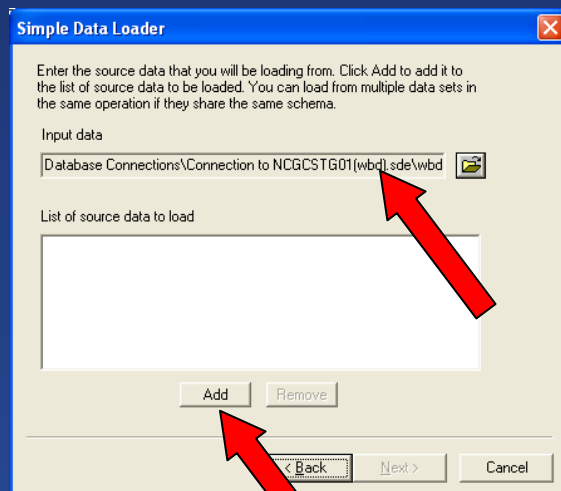
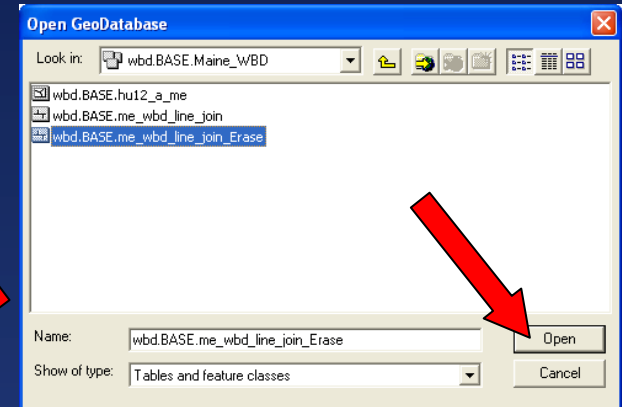
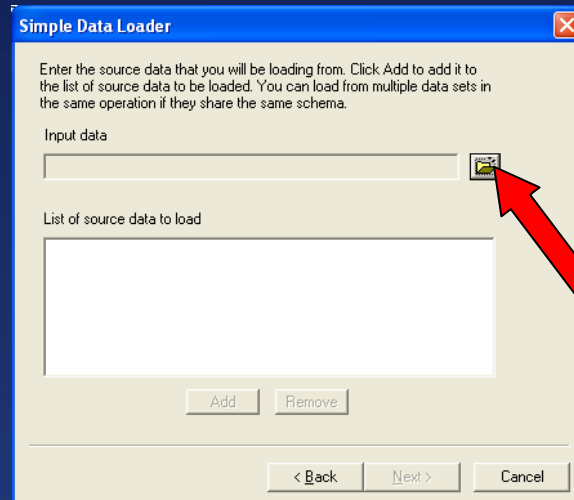
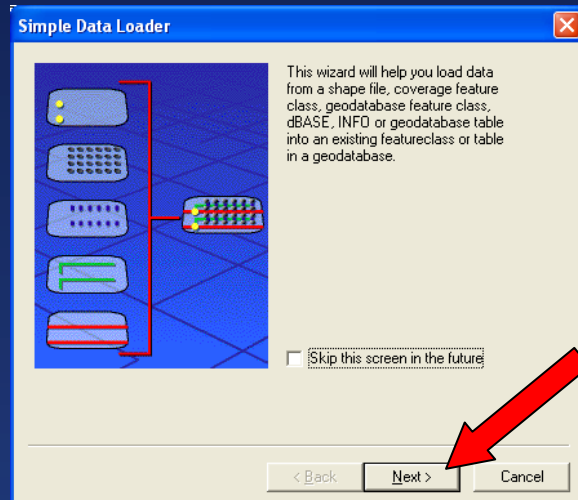
< Back **Finish** Cancel

Follow the same procedure for loading the Maine edited arcs into the Check-Out database.

In ArcCatalog, right-click the HU12_arc layer in your Check-Out, and select “Load”, then “Load Data...”



...and browse to the location where the updated Maine
polygons reside that were clipped in an earlier step.



On the next screen, ensure that all Target fields have a Matching Source Field. You may need to update a field if any column headings do not match those of the SDE layer column headings.

Simple Data Loader

For each target field, select the source field that should be loaded into it.

Target Field	Matching Source Field
HU_LEVEL [short int]	HU_LEVEL [short int]
LINESOURCE [string]	LINESOURCE [string]
META_ID [string]	META_ID [string]
LEFT_HUC_8 [string]	LEFT_HUC_8 [string]
RIGHT_HUC_8 [string]	<None>

Dropdown menu for RIGHT_HUC_8 [string]:

- <None>
- OBJECTID [int]
- HU_LEVEL [short int]
- LINESOURCE [string]
- META_ID [string]
- SHAPE_LENGTH [double]
- FID_1 [int]
- LEFT_FID [int]
- RIGHT_FID [int]
- LEFT_HUC_8 [string]
- RIGHT_HUC_8 [string]
- SHAPE_LEN [double]

< Back Next > Cancel

Simple Data Loader

You can load all of the features from your source data into the target feature class or you can limit what is loaded by defining an attribute query.

☒ Load all of the source data

☐ Load only the features that satisfy a query

Query Builder...

< Back Next > Cancel

Simple Data Loader

Summary

Summary for data load operation

Source data: Database Connections\Connection to NCGCSTG01(wbd).sde\wbd.BASE.Maine_WBD\wbd.BASE.me_wbd_line_join_Erase

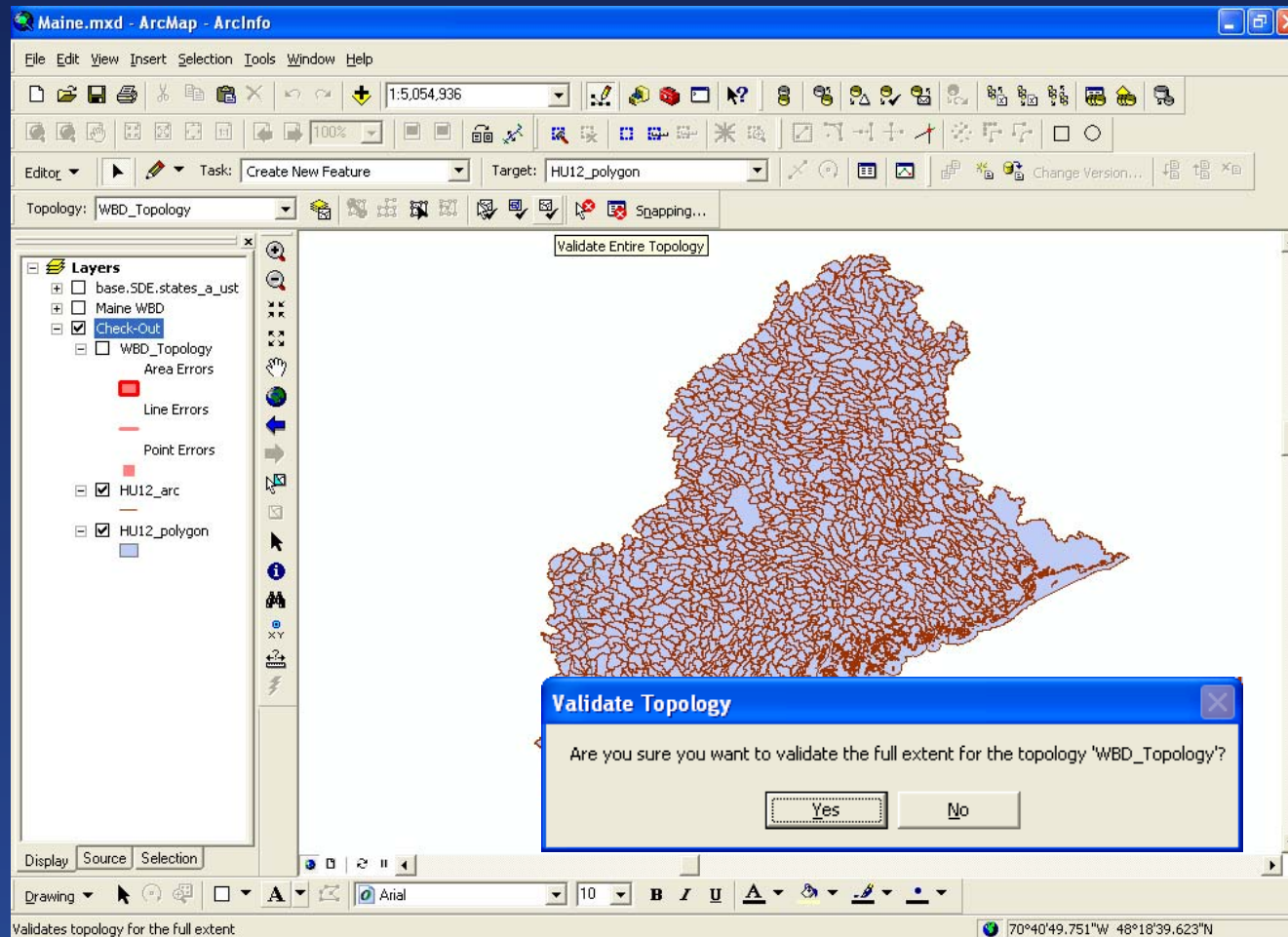
Target geodatabase: C:\WBD\PowerPoints\ME-NH_border.mdb

Target feature class: HU12_arc

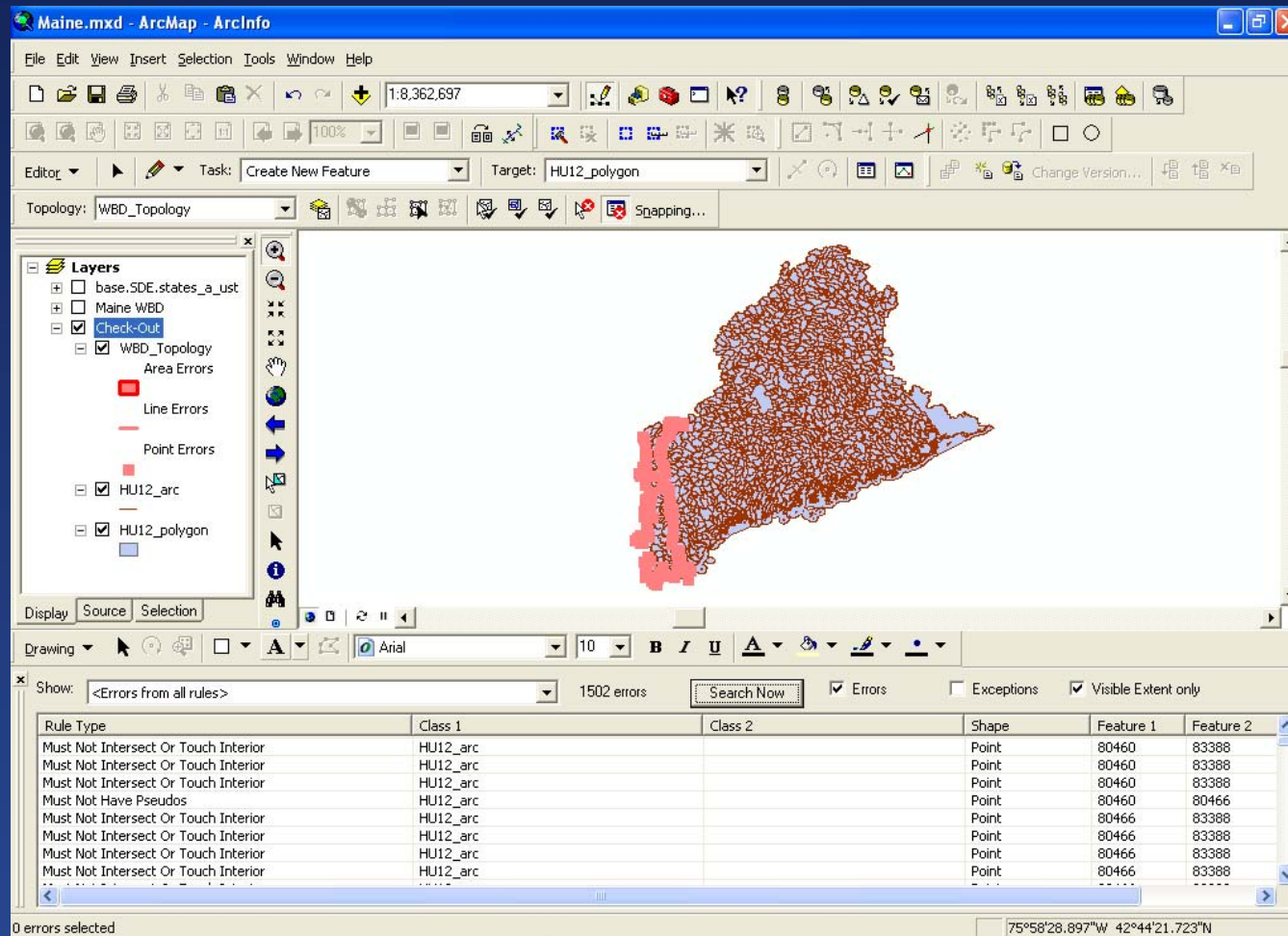
Query:

< Back Finish Cancel

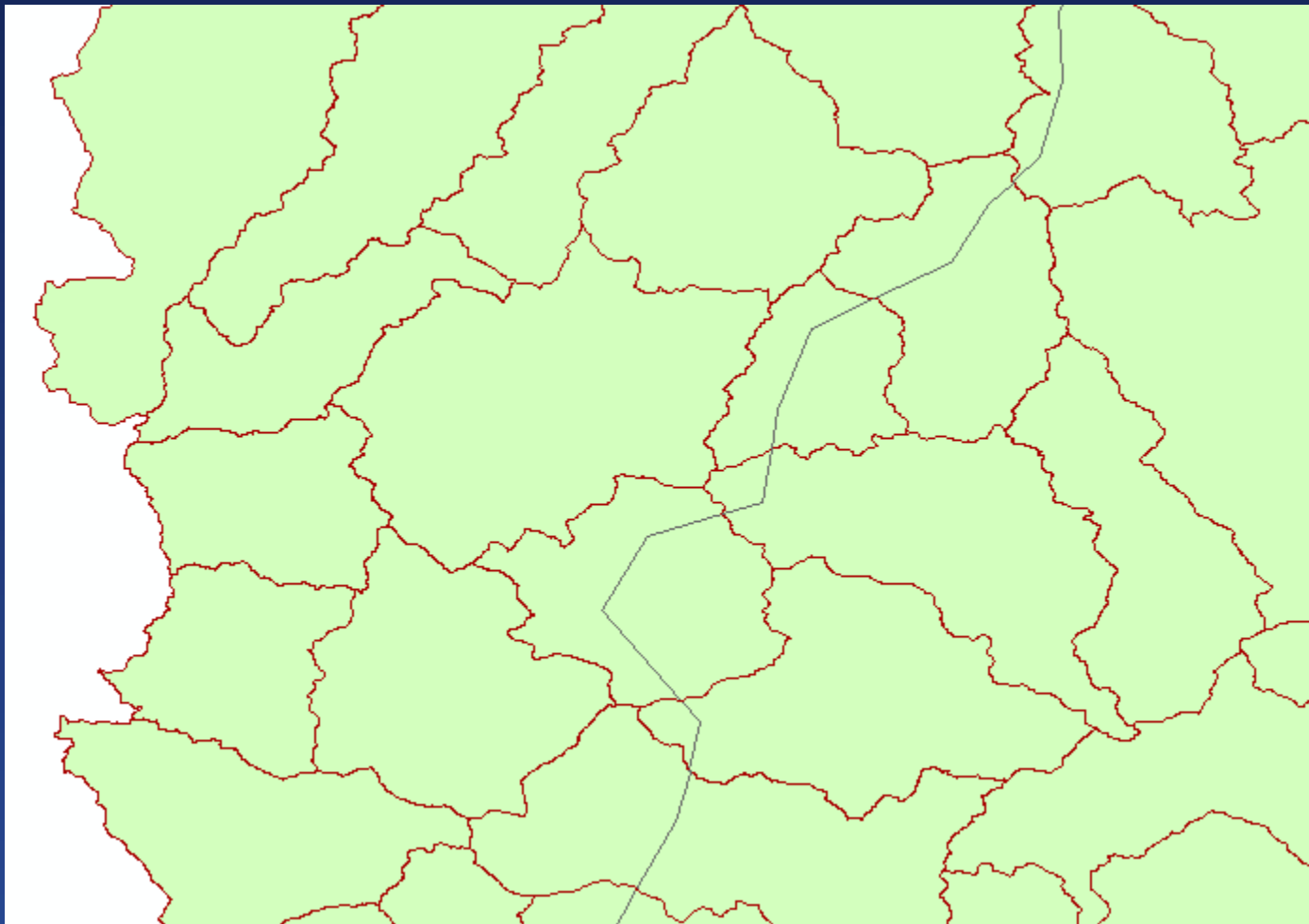
Once loading of arcs and polygons into the Check-Out geodatabase is complete, open the geodatabase up in ArcMap and run Topology Validation for the entire Check-Out geodatabase.



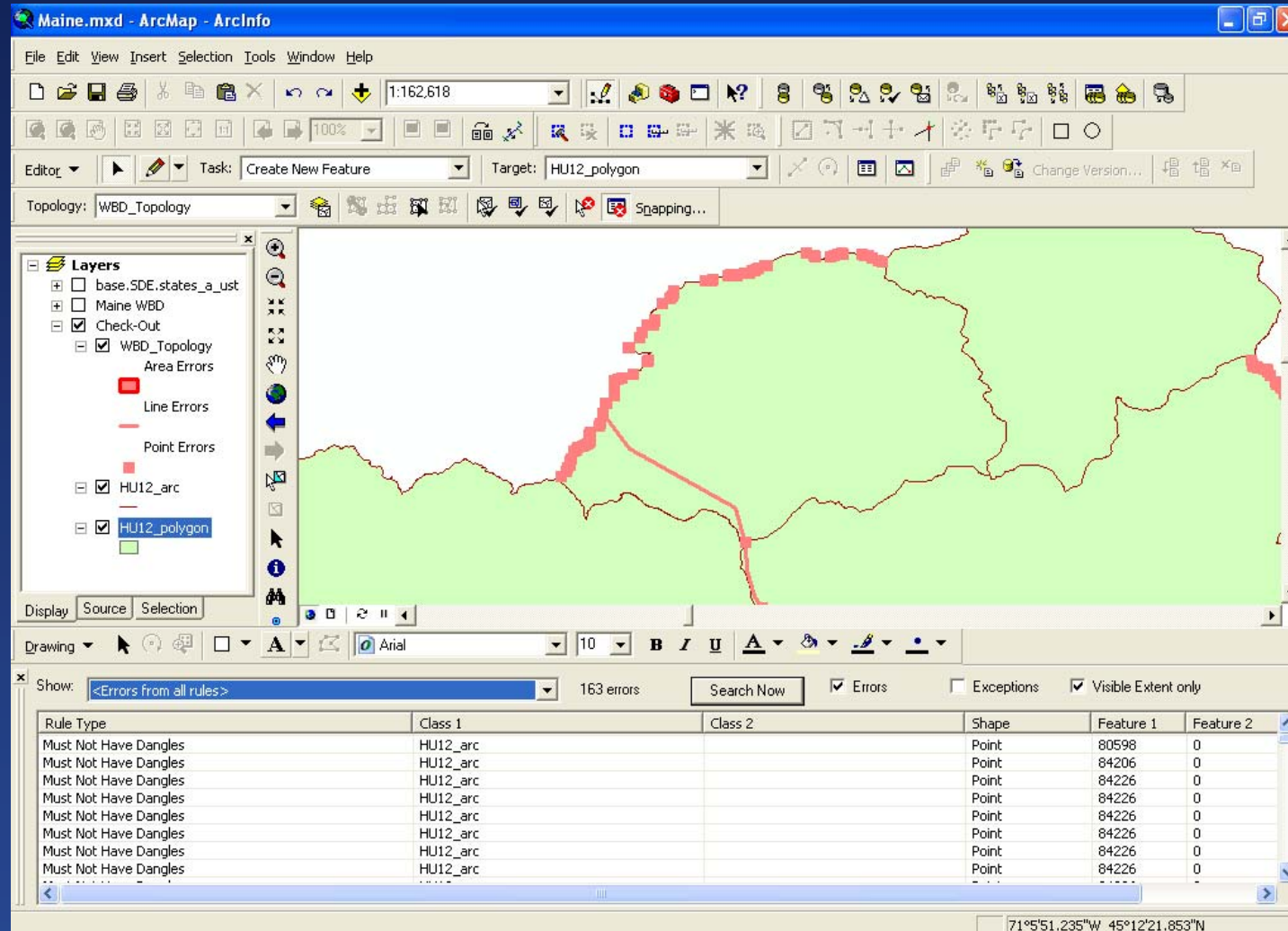
Initially, before any edits occur, there are a little over 1500 topology errors, but these actually clean up pretty fast with lots of quick tricks in topology editing we've been learning. The first thing to fix is to merge the polygons.



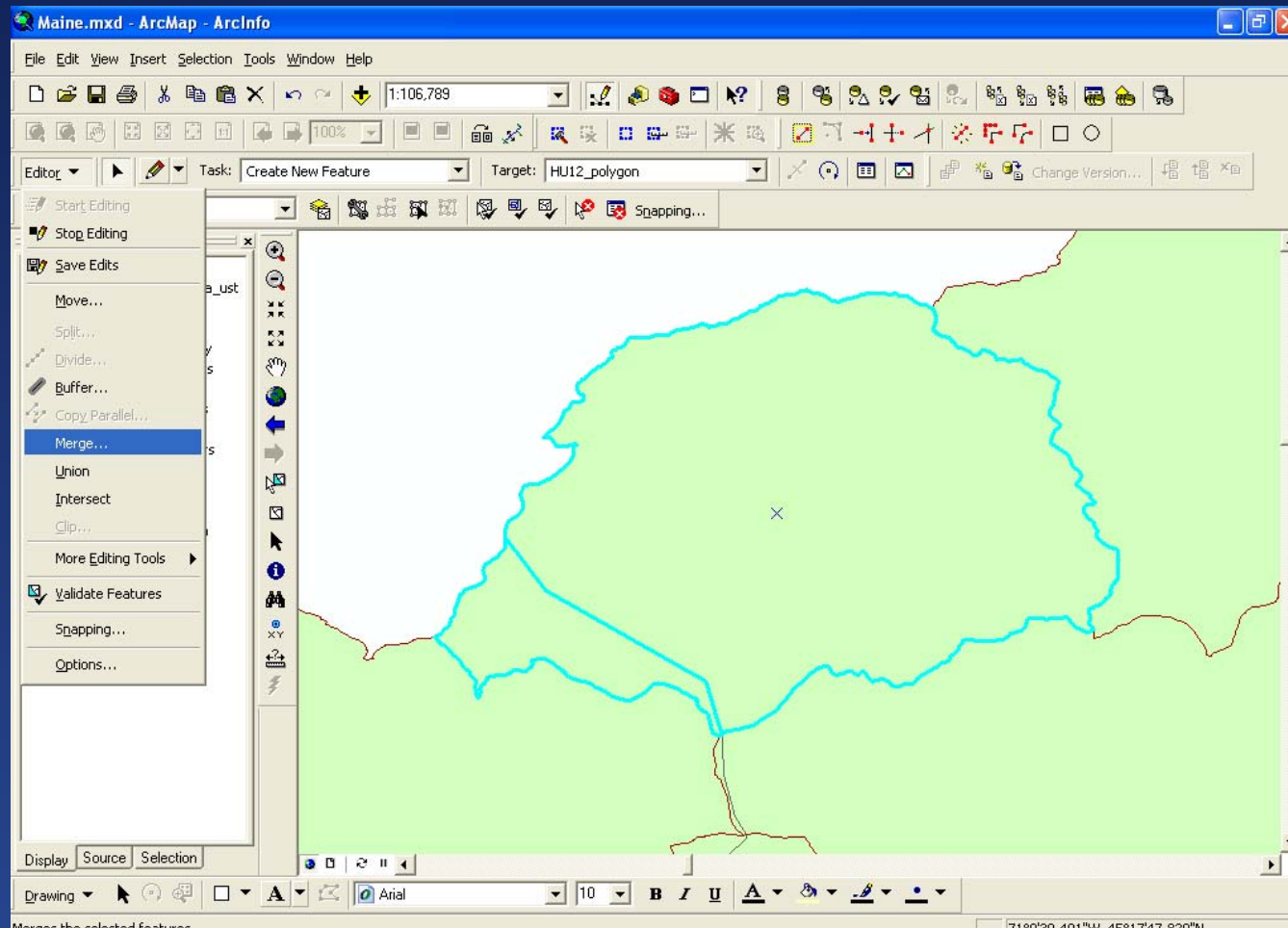
The jagged gray line shows the break between the polygons to be merged that were originally between the Maine dataset and the New Hampshire dataset. Again, when we merge, Maine's attributes will be the default per agreement between the states.

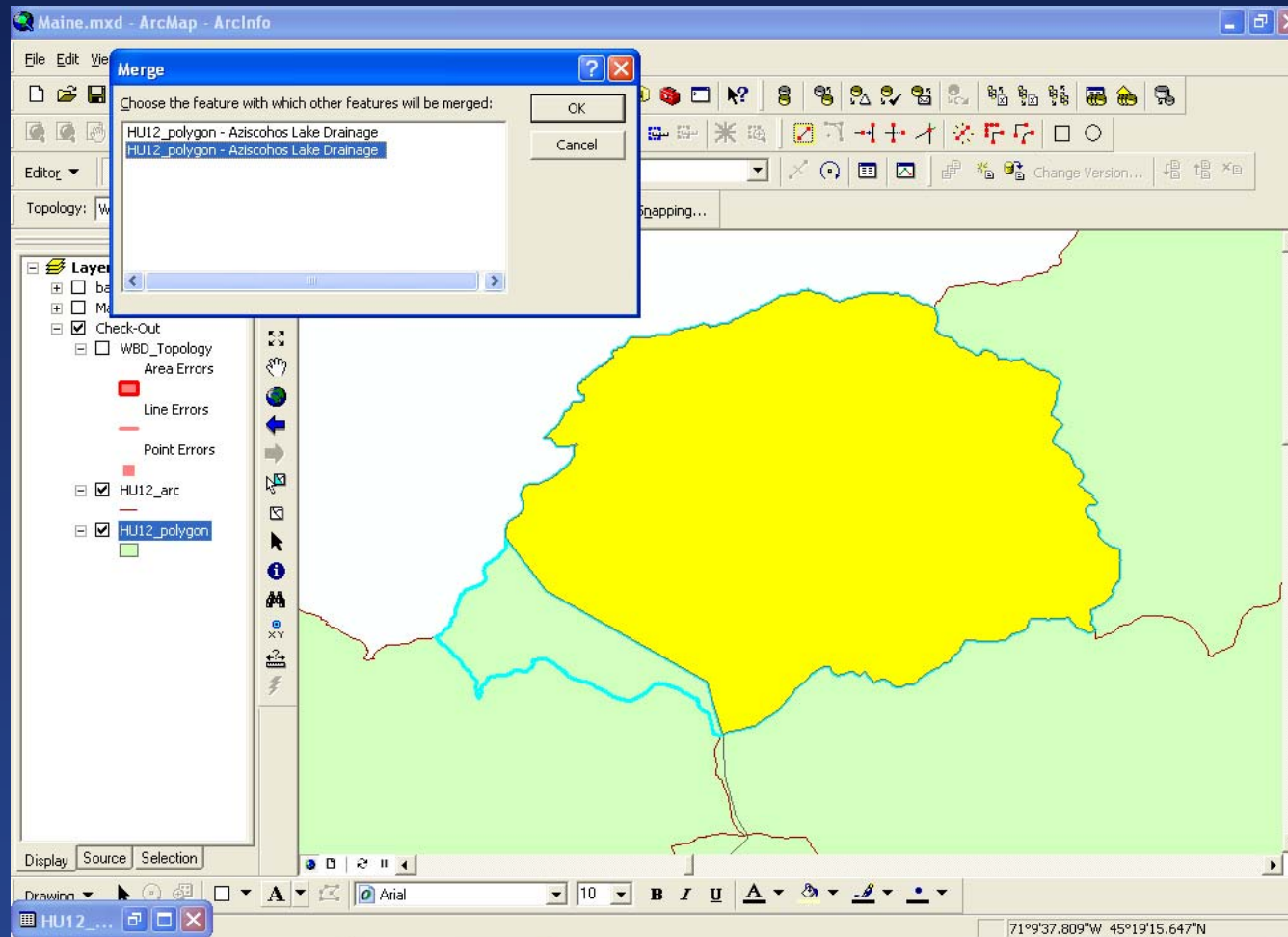


Sample area where I will start with editing topology. Current extent: 163 errors.

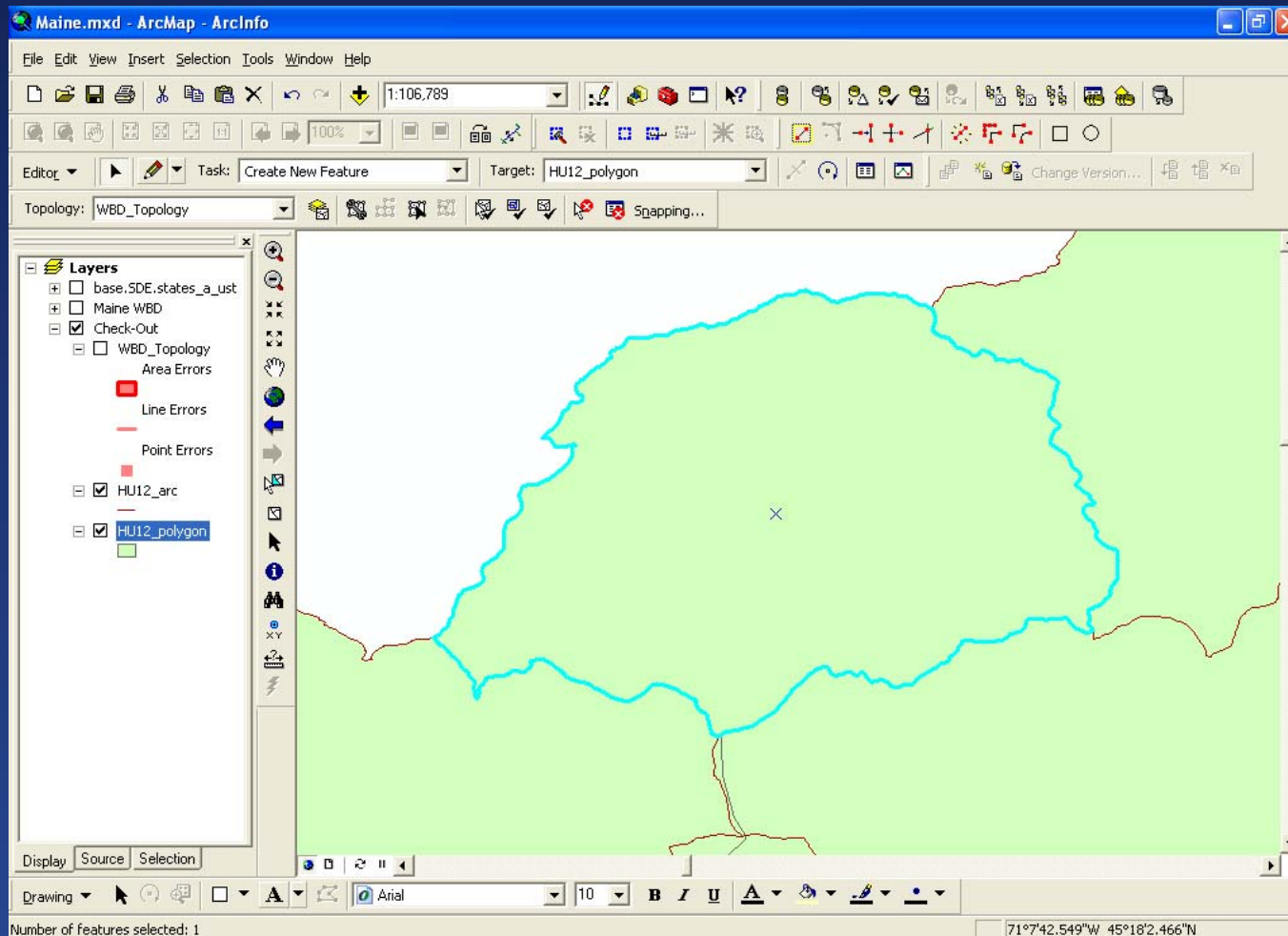


Select the first two polygons to be merged, then click the Editor toolbar, and “Merge” which will bring up a window that asks which polygon’s attributes will be accepted.

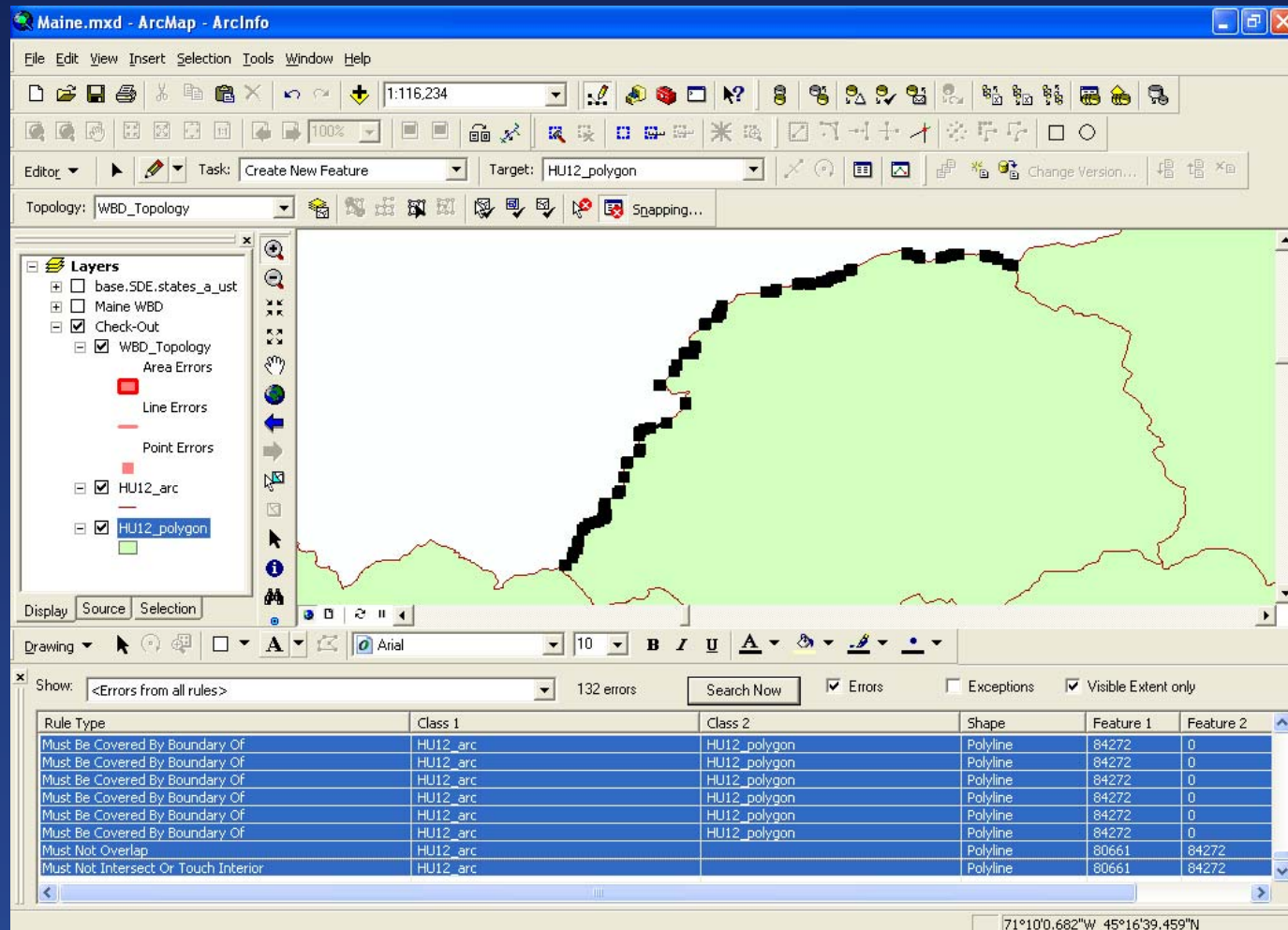




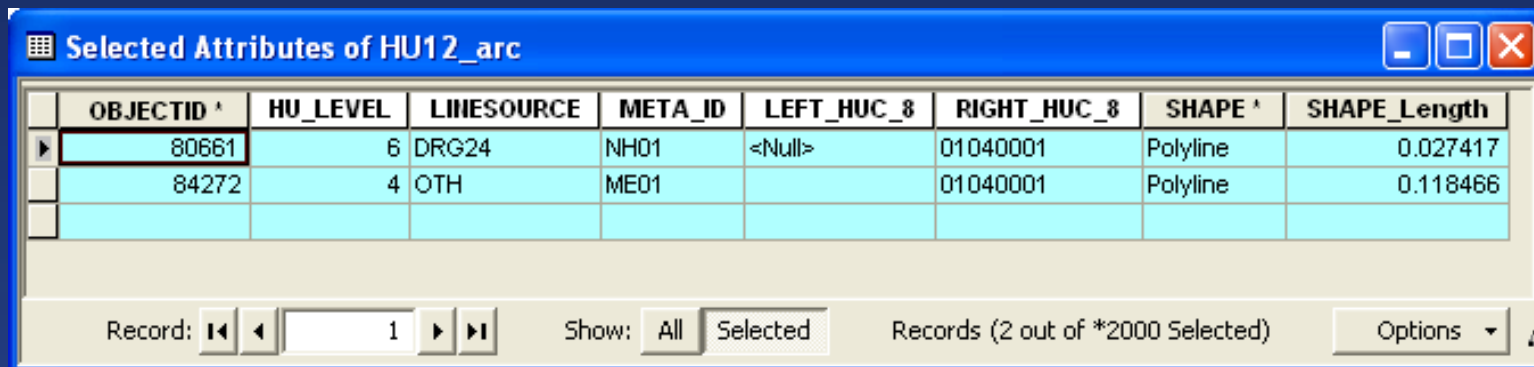
United States Department of Agriculture Natural Resources Conservation Service



It is obvious from this view that 132 errors would be eliminated if we simple get rid of the current line and redraw it so that it will follow the of the polygon feature.



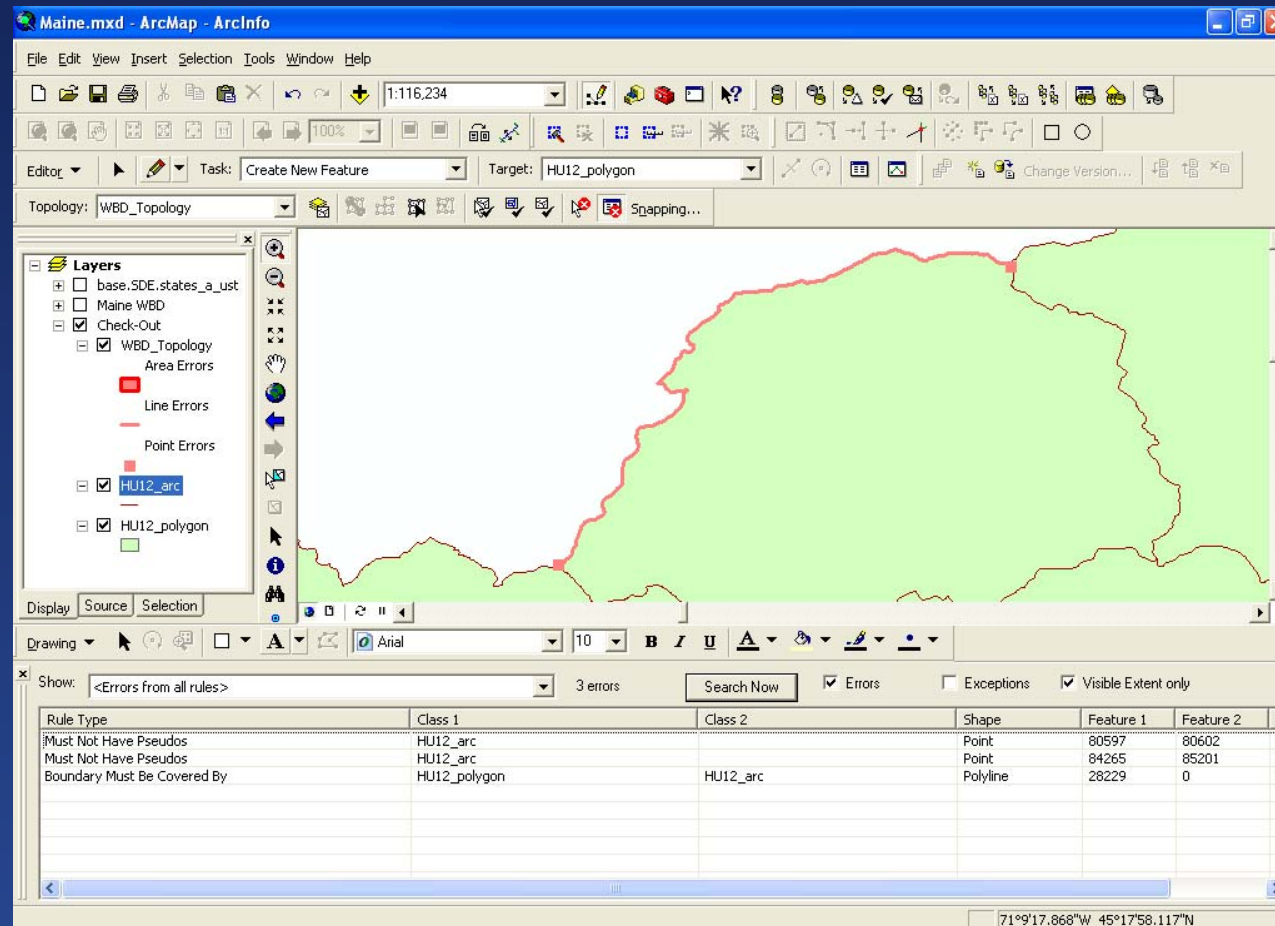
By right clicking the topology errors and choosing “Select Features”, all of the features affected by the errors are selected in ArcMap. Since I don’t want to get rid of the polygon feature, I unselect it, and am left with the two arcs that are the culprits of the 132 errors (dangles, must not touch interior, etc.). I choose which attributes will be added back to the new line when it is redrawn, then I delete these two line features.



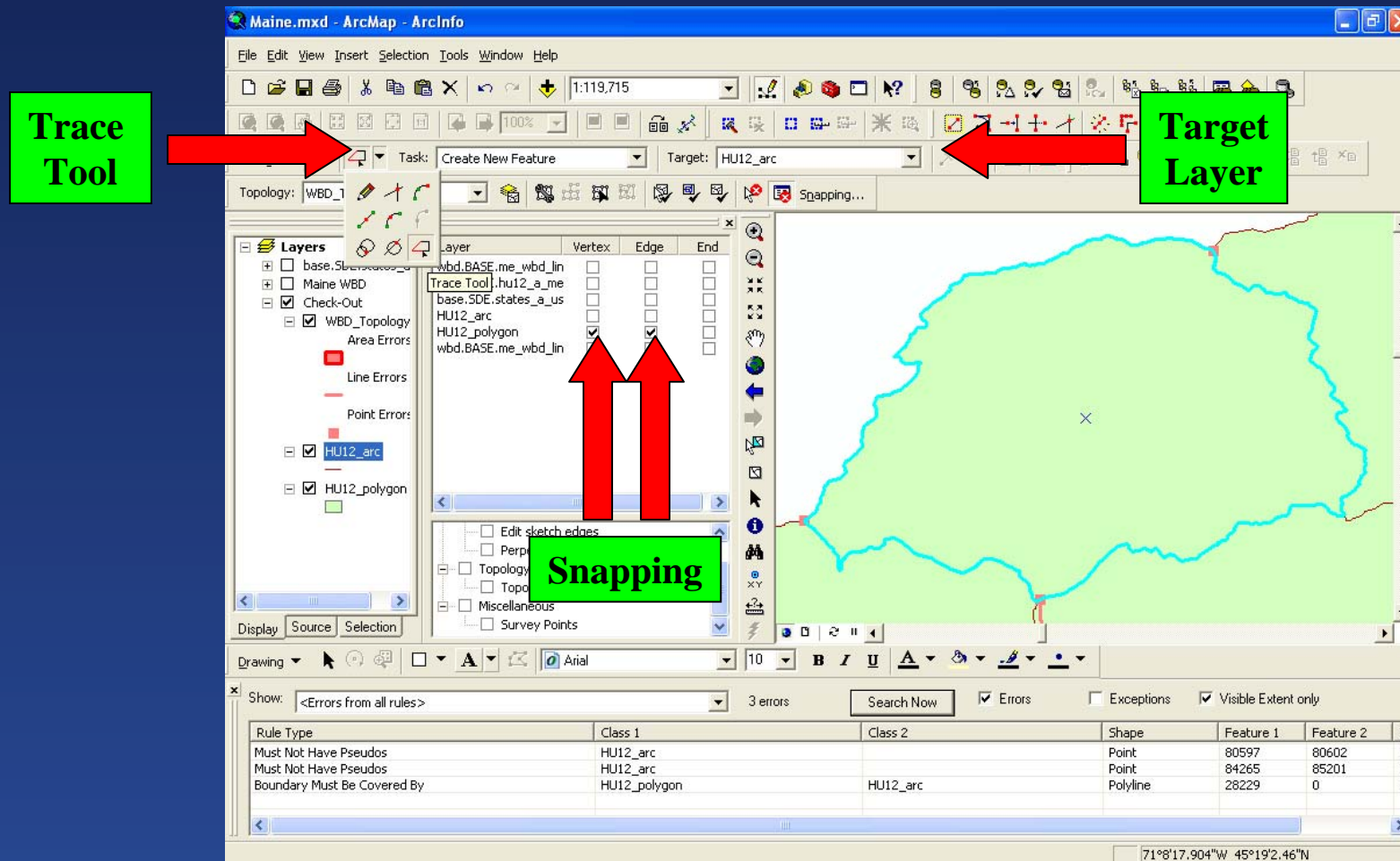
OBJECTID ^	HU_LEVEL	LINESOURCE	META_ID	LEFT_HUC_8	RIGHT_HUC_8	SHAPE ^	SHAPE_Length
80661	6	DRG24	NH01	<Null>	01040001	Polyline	0.027417
84272	4	OTH	ME01		01040001	Polyline	0.118466

Record: 1 Show: All Selected Records (2 out of *2000 Selected) Options

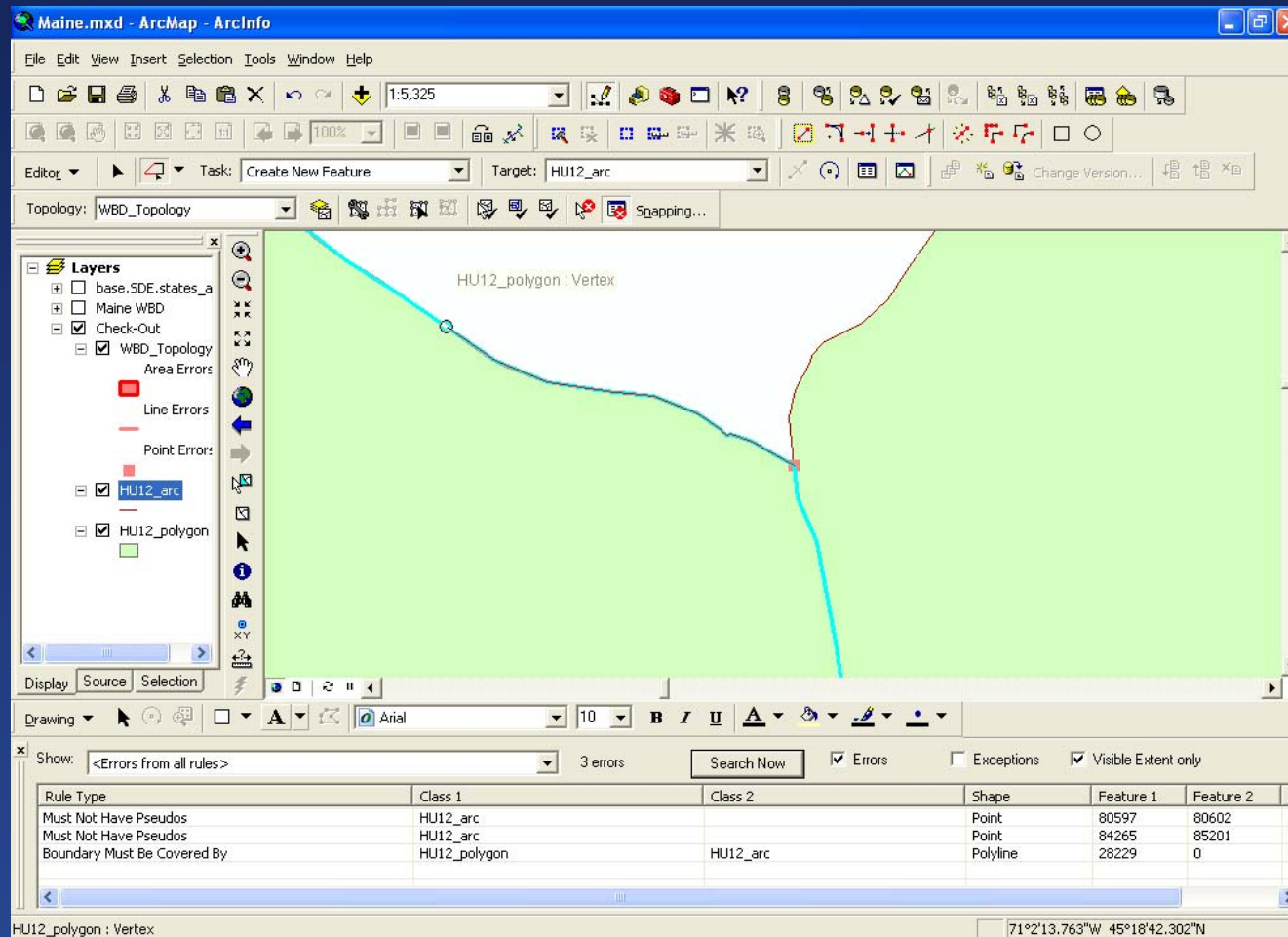
After deleting the two line features and running topology validation again for the same area, there are only three errors that will be eliminated when the new line is drawn.



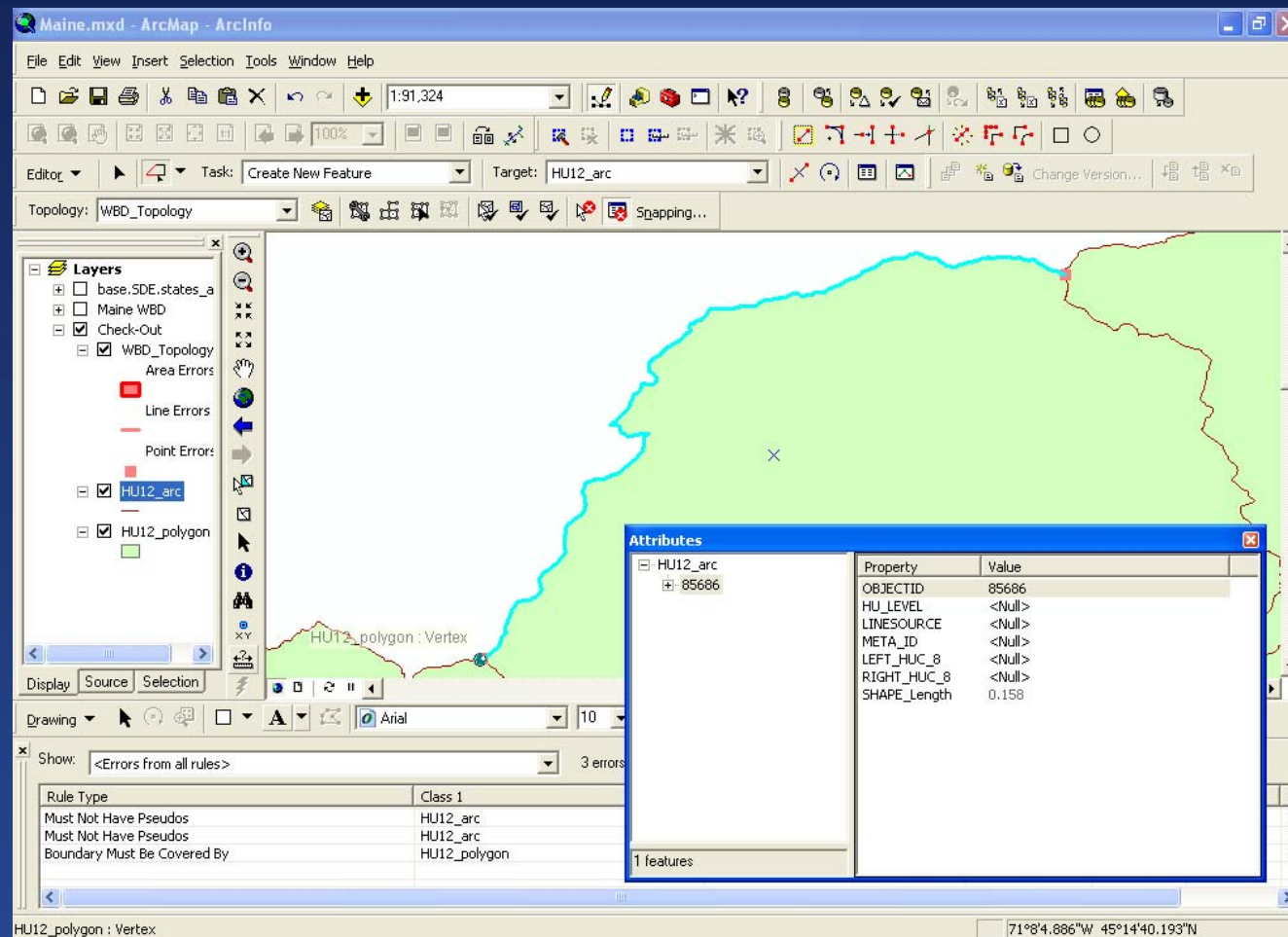
To create the new line (still in an Edit session) select the polygon upon which you will use the “Trace” tool; be sure appropriate Snapping is set, the Trace tool is selected, and the arc layer is the target.



Zoom in to the beginning of where the line is to be drawn, click where the first vertex will go, zoom out some and allow the tool to trace the extent of the side of the polygon until you reach the other end, where you will double click to complete the new feature.



When the line is completed, it still has Null values in the attribute table that will need to be filled in accordingly by the attributes of the original lines that were deleted.



In this instance, the new line's attributes are updated
with a combination of the original lines.

Selected Attributes of HU12_arc

OBJECTID ^	HU_LEVEL	LINESOURCE	META_ID	LEFT_HUC_8	RIGHT_HUC_8	SHAPE ^	SHAPE_Length
80661	6	DRG24	NH01	<Null>	01040001	Polyline	0.027417
84272	4	OTH	ME01		01040001	Polyline	0.118466

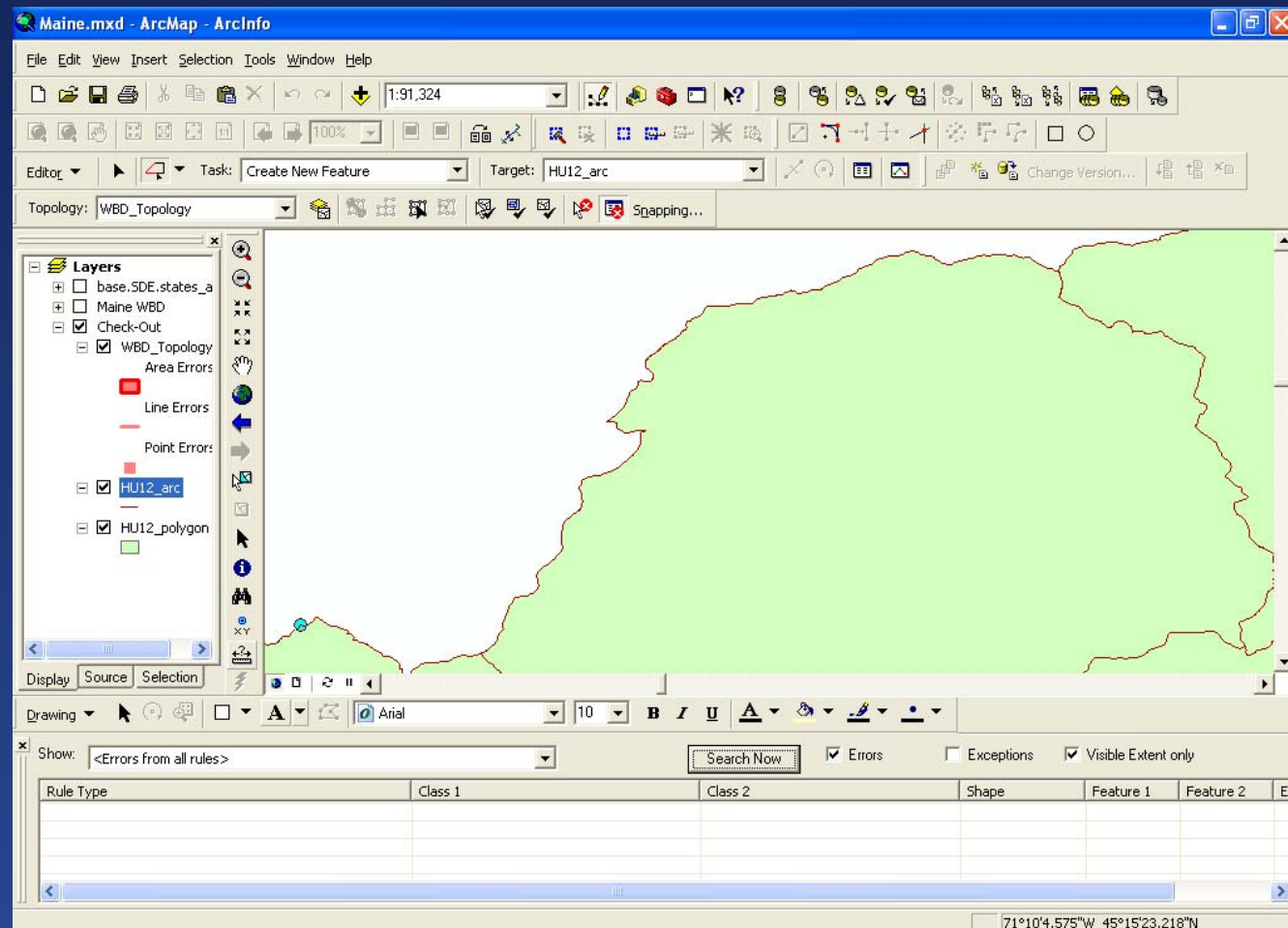
Record: 1 Show: All Selected Records (2 out of *2000 Selected) Options

Attributes

Property	Value
OBJECTID	85686
HU_LEVEL	4
LINESOURCE	DRG24,OTH
META_ID	ME01
LEFT_HUC_8	<Null>
RIGHT_HUC_8	01040001
SHAPE_Length	0.158

1 features

**Save edits, run topology validation for current extent, and no errors occur for this area.
Move on to the next extent and edit all other topology errors until there are no longer
any topology errors to correct.**



Other factors in Topology Editing

The previous Topology Editing examples are not all the types of edits that need to occur. In addition to polygon merges and linework recreation, other edits can include hundreds of dangles will need to be fixed, or if a state sends in a dataset that is clipped by a different boundary or does not extend and meet the other state's boundary, many hundreds of gaps will need to be filled in.

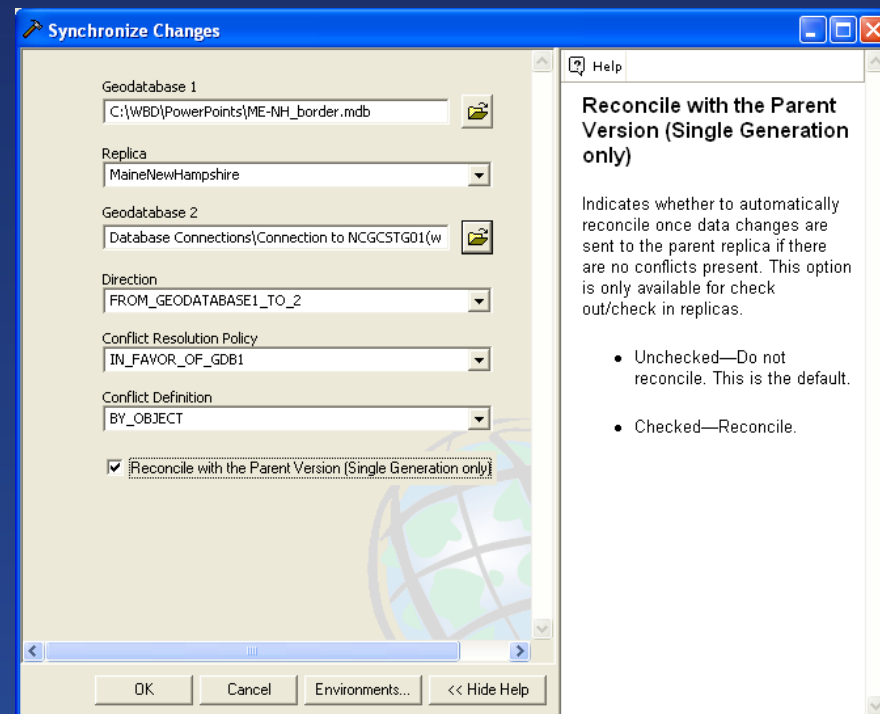
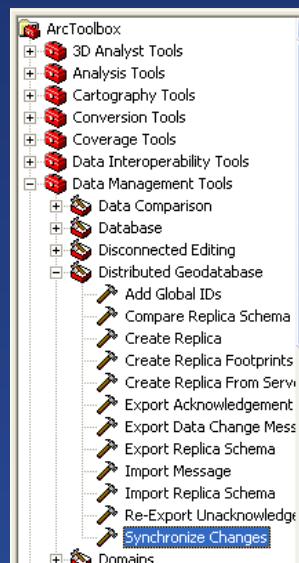
The amount of time needed for editing topology errors can depend on the extent of errors as well as how many borders need to be merged. As more states begin to fill in the map, more time will be needed to fill in other states as more borders need to be coordinated and integrated.

Synchronize Changes back to SDE Database

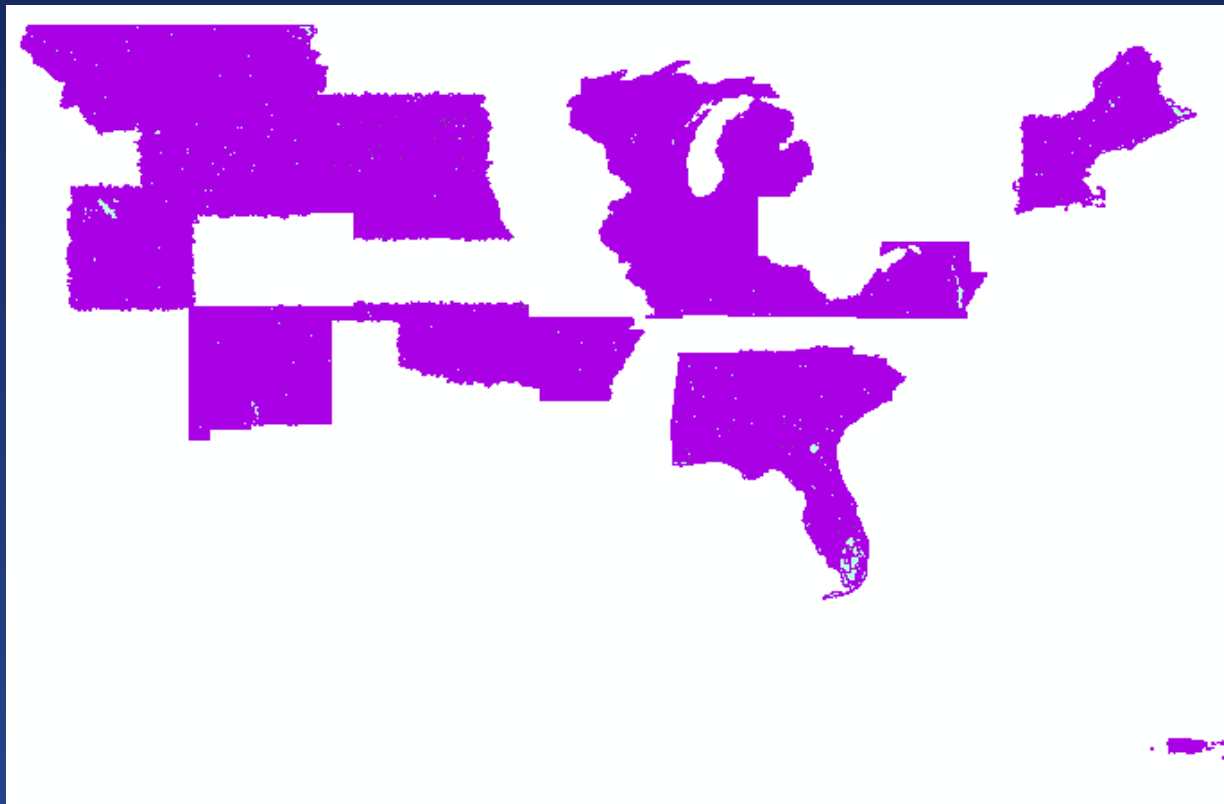
Once all Topology Errors have been corrected, ensuring saving often as well as running Topology validation regularly as errors are getting corrected, then running a final Topology validation on the full extent of the Check-Out, it is time to Synchronize the Changes back to the original SDE database.

Stop your edit session in ArcMap, add the original SDE layers back in to ArcMap where the Check-Out layers are, but do NOT start an Edit session.

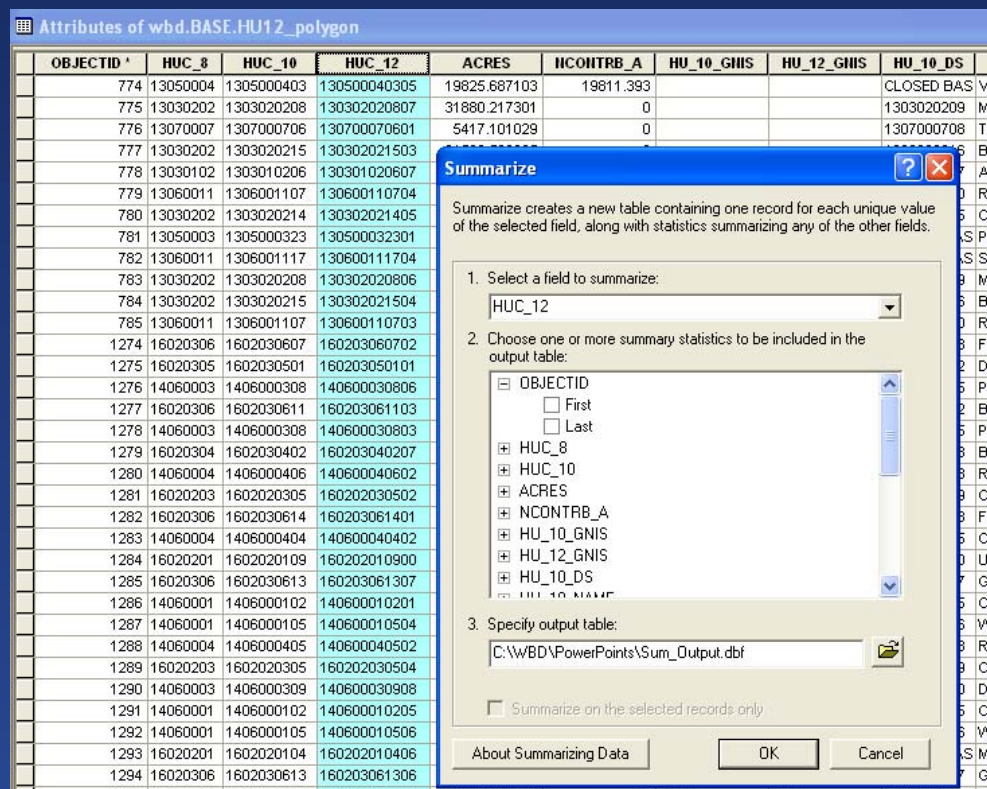
Run the “Synchronize Changes” tool from ArcToolbox.



Once the changes have been synchronized, Validate Topology for the entire SDE geodatabase (you must be in an edit session here) to ensure there are no more Topology errors that have occurred.



- Check entire SDE layer for illegitimate duplicate HUC12 coded polygons by running a summary on the HUC_12 column in the attribute table.
- Contact state and correct if any exist.



- **Copy the updated SDE layers to their permanent location if another SDE database is to be the final source data server.**
- **Update appropriate state and seamless layer metadata files and fields on the ftp server.**
- **Create a data extraction shapefile of polygons from the new Certified state to give to the person updating the layer for PRS (Performance Results System, an NRCS Application).**
- **Begin remainder of Gateway processing steps.**

Dissolve SDE polygon layer using HUC_8

Dissolve

Input Features
wbd.BASE.HU12_polygon

Output Feature Class
C:\WBD\wbd_subindex.shp

Dissolve_Field(s) (optional)

- ☐ OBJECTID
- ☒ HUC_8
- ☐ HUC_10
- ☐ HUC_12
- ☐ ACRES
- ☐ NCONTRB_A
- ☐ HU_10_GNIS
- ☐ HU_12_GNIS
- ☐ HU_10_DS

Select All Unselect All Add Field

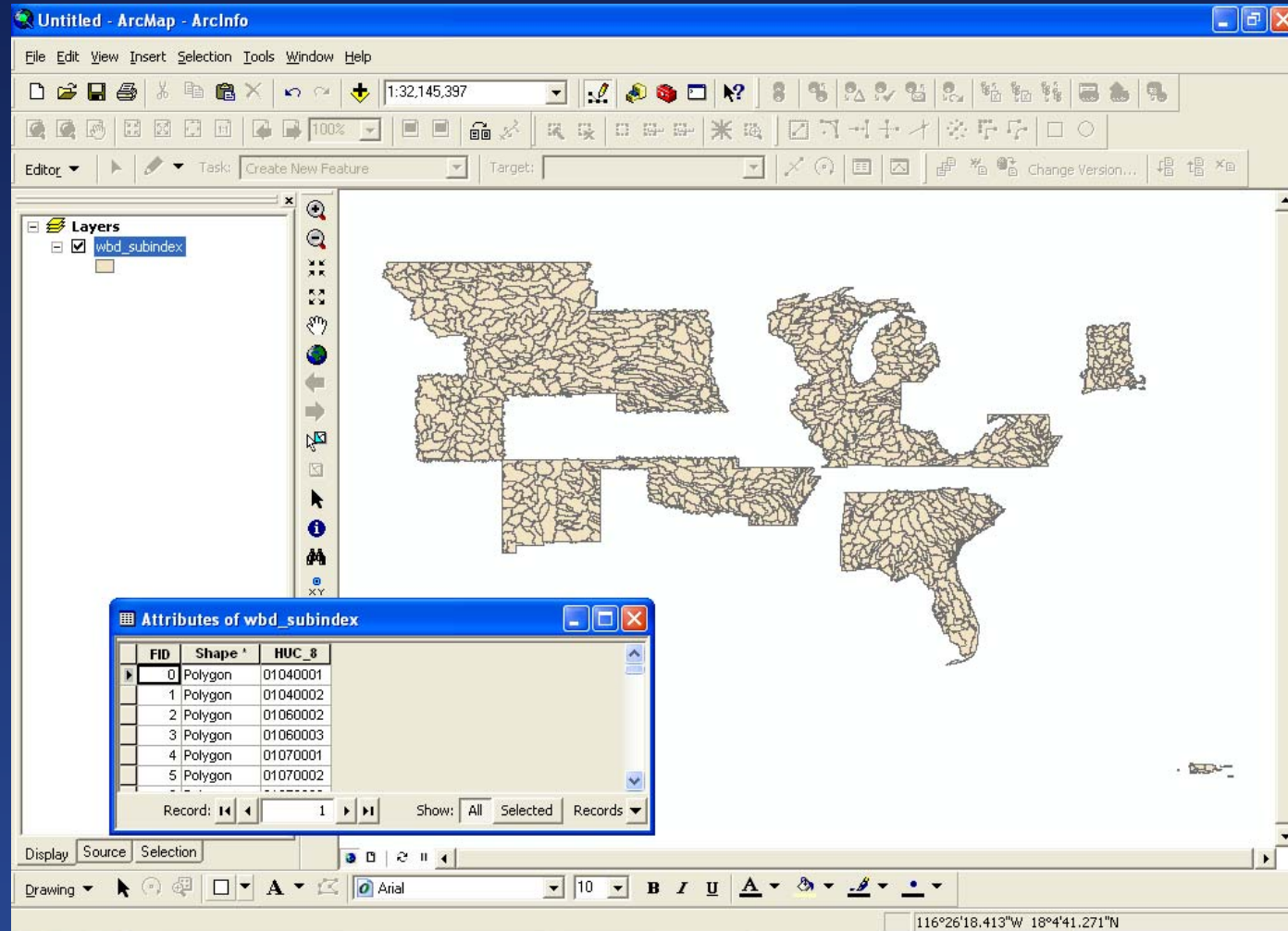
Statistics Field(s) (optional)

Field	Statistic Type

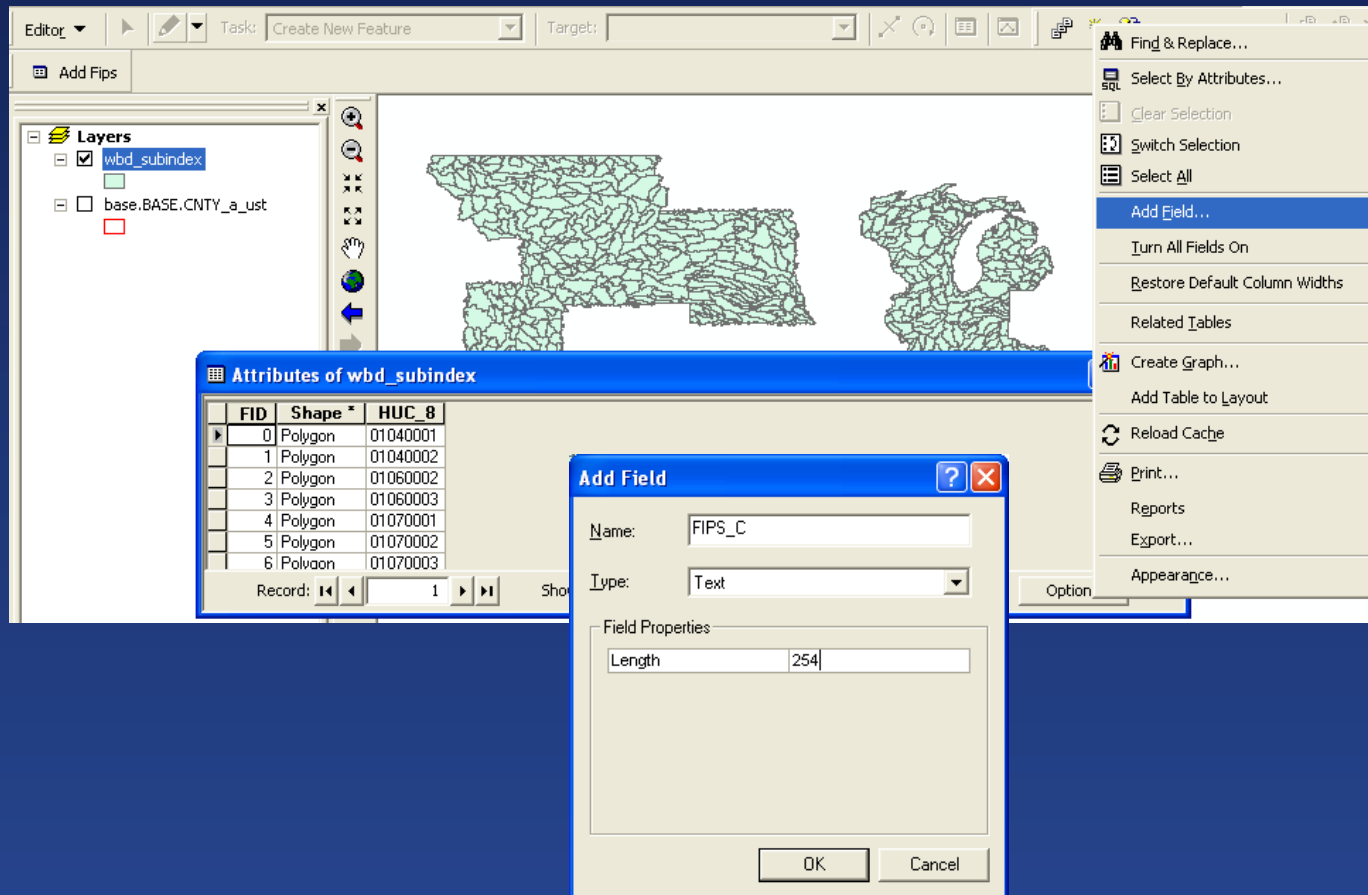
☒ Create multipart features

OK Cancel Environments... << Hide Help

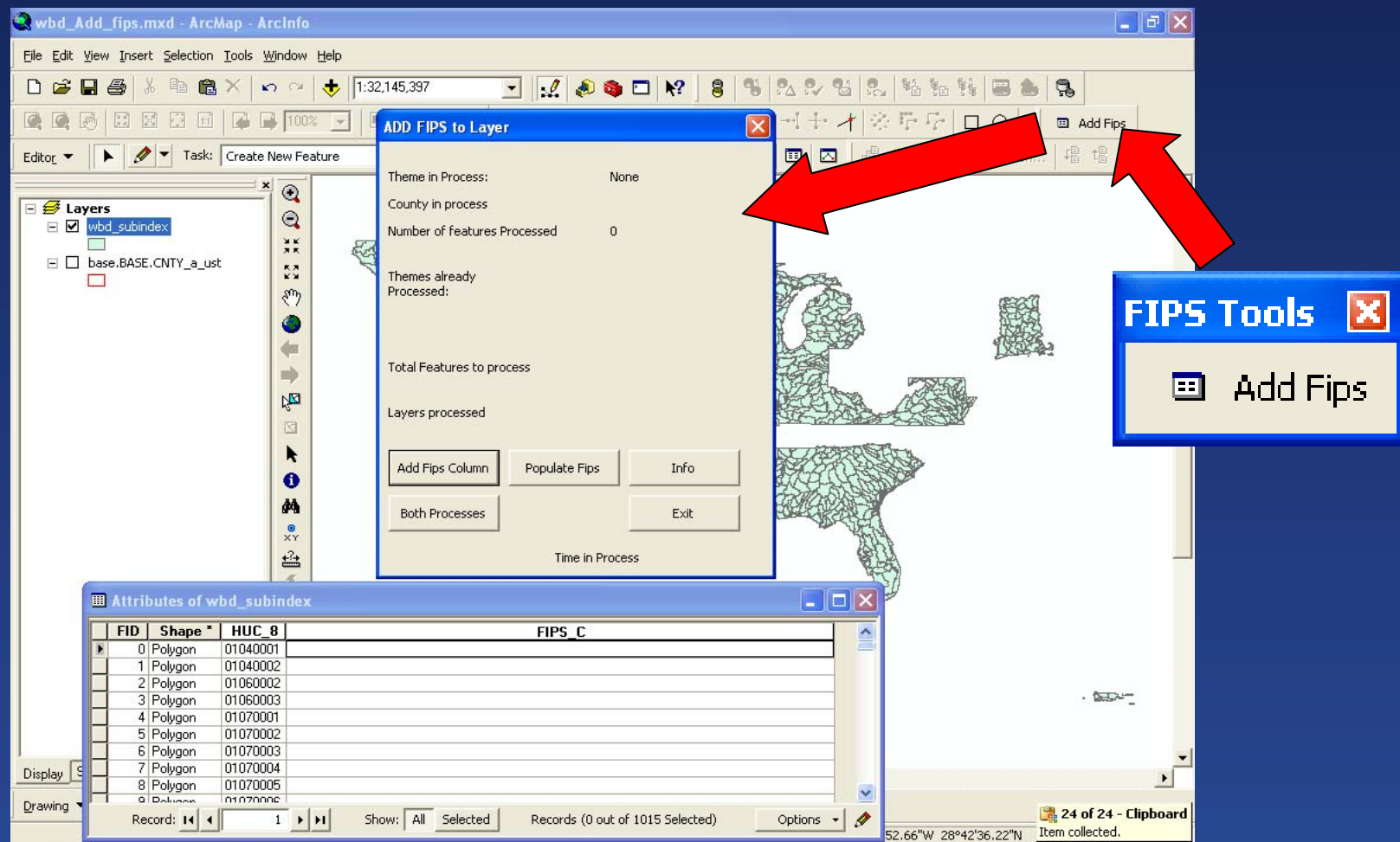
Resulting in a one record per subbasin index.



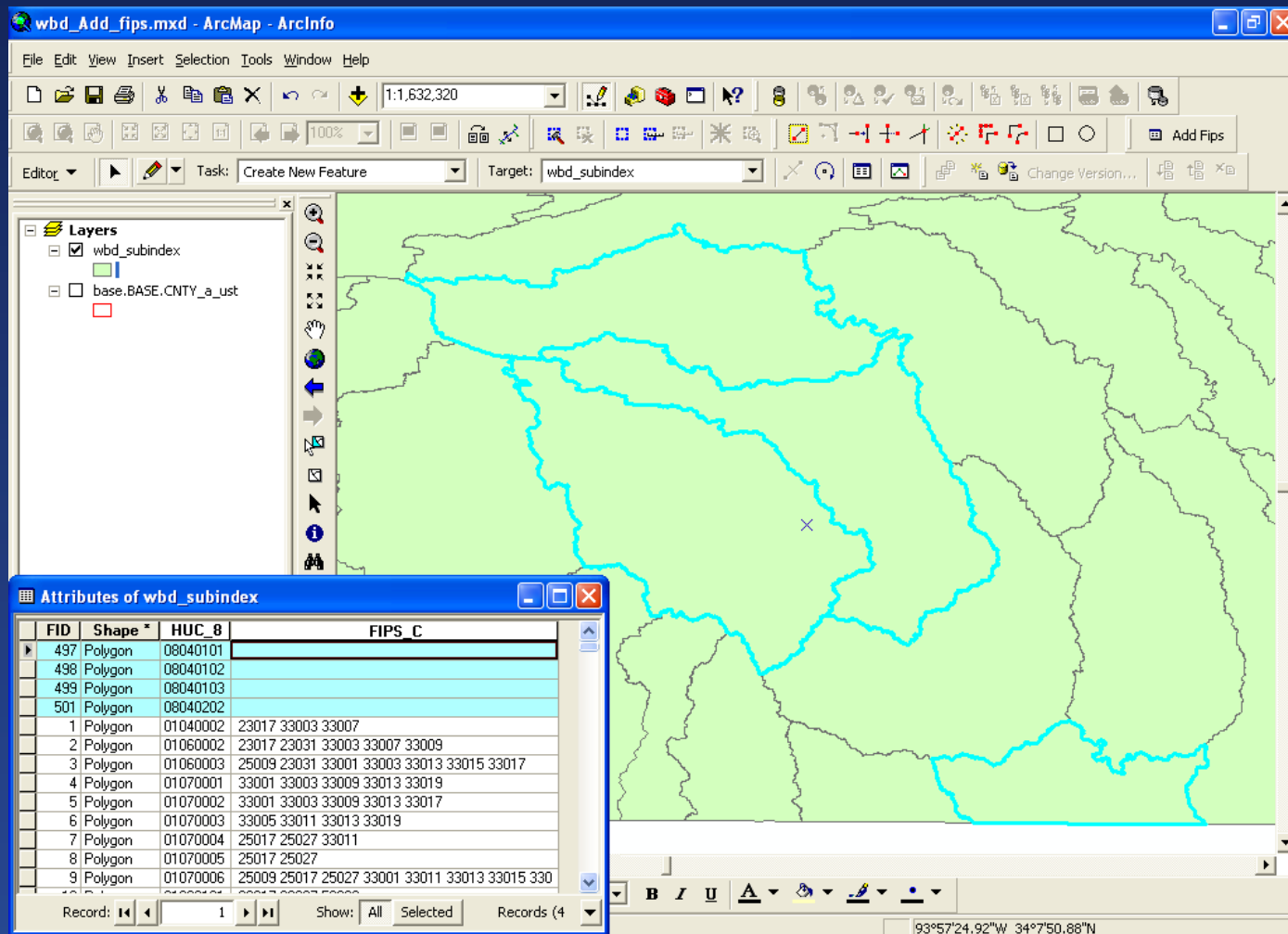
Next, add a FIPS_C column in the wbd_subindex.shp...



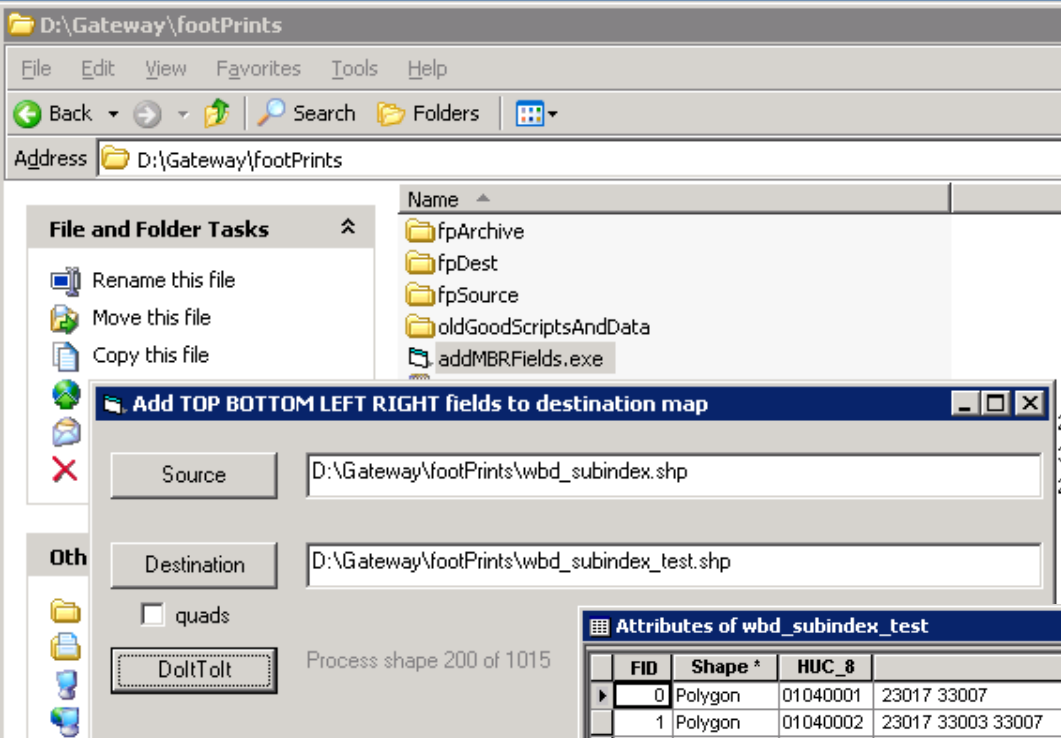
...and run the Add_FIPS script in an edit session of ArcMap to populate the column for all counties that the subbasin crosses...



...possibly editing a few manually
that the script may have missed.



The addMBRFields.exe is run next that adds columns and data to the wbd_subindex.shp file for the coordinates of the Minimum Bounding Rectangle of each subbasin.



File and Folder Tasks

- Rename this file
- Move this file
- Copy this file

Other

quads

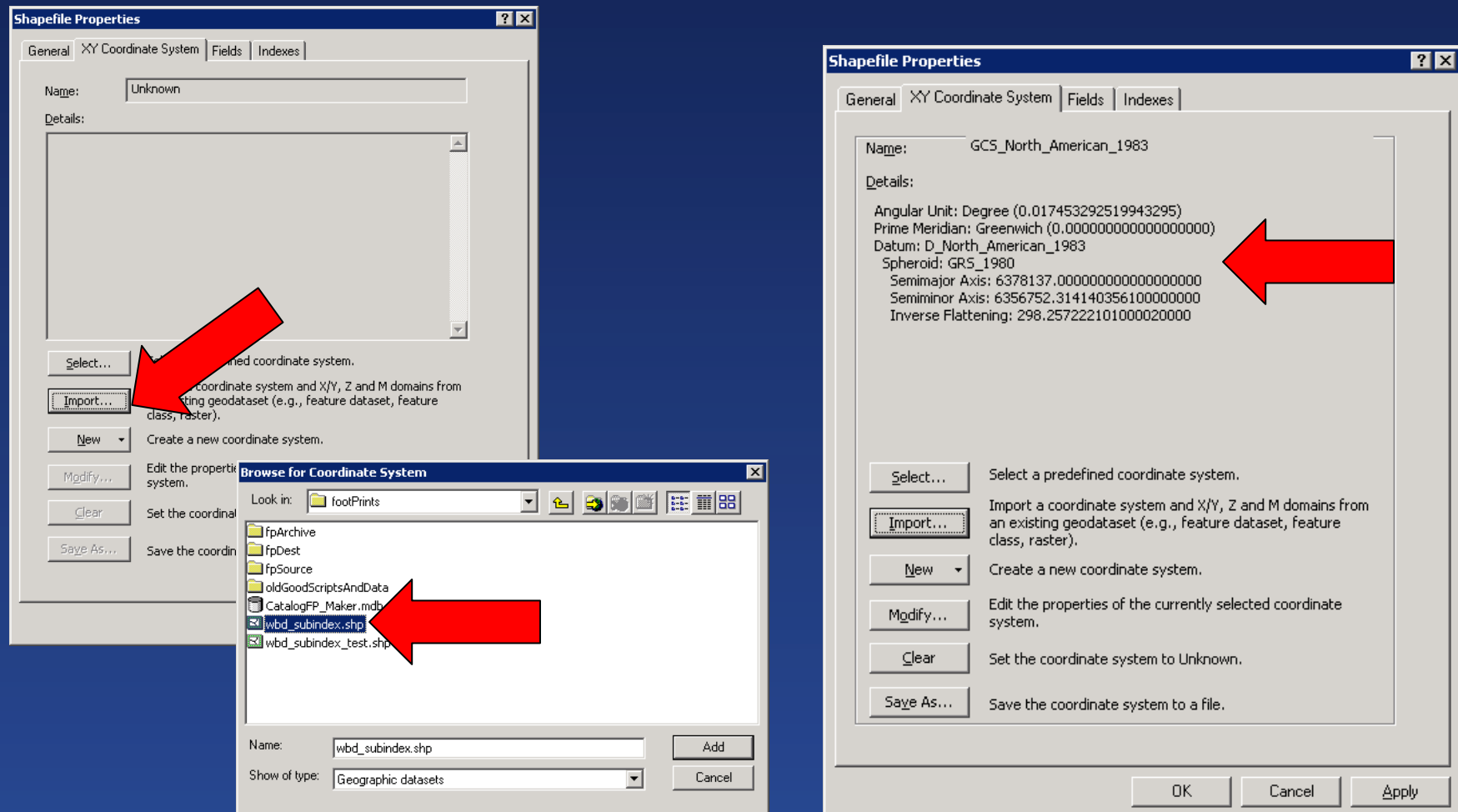
DoltTolt

Process shape 200 of 1015

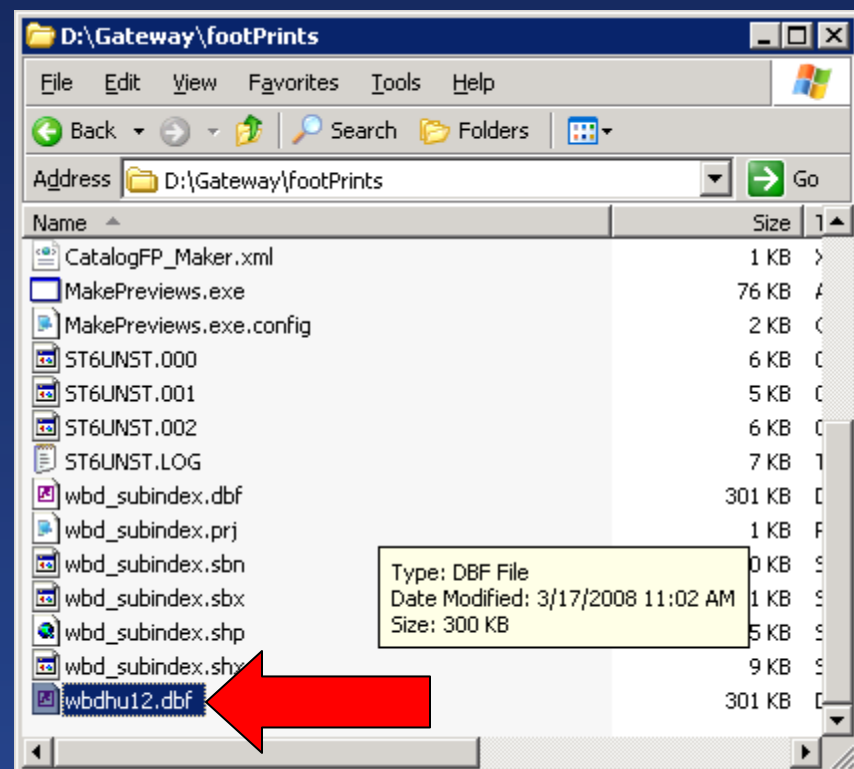
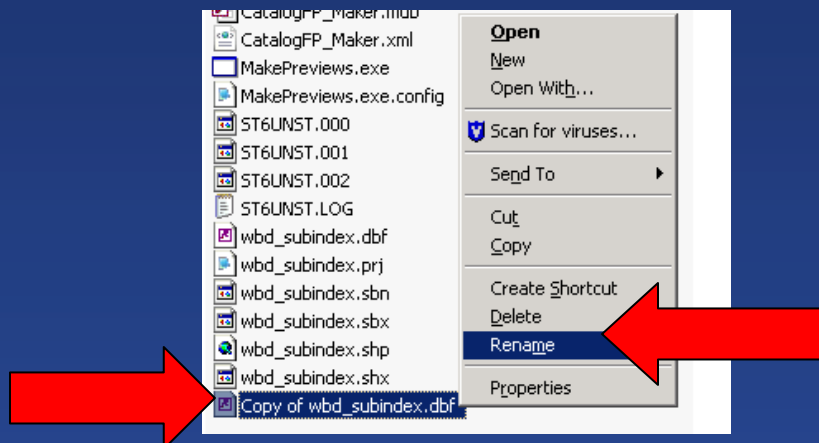
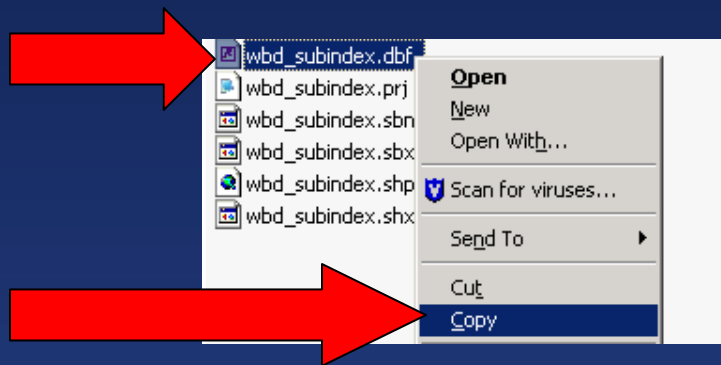
Attributes of wbd_subindex_test

FID	Shape *	HUC_8	FIPS_C	BOTTOM	TOP	LEFT	RIGHT
0	Polygon	01040001	23017 33007	44.40794	45.31381	-71.3431	-70.8839
1	Polygon	01040002	23017 33003 33007	44.2255	44.48906	-71.353	-70.929C
2	Polygon	01060002	23017 23031 33003 33007 33009	43.57608	44.3102	-71.52288	-70.805E
3	Polygon	01060003	25009 23031 33001 33003 33013 33015 33017	42.82197	43.6206	-71.3635	-70.6624
4	Polygon	01070001	33001 33003 33009 33013 33019	43.43126	44.19902	-72.03234	-71.4007
5	Polygon	01070002	33001 33003 33009 33013 33017	43.3953	43.82846	-71.65506	-71.077E
6	Polygon	01070003	33005 33011 33013 33019	42.74235	43.52729	-72.1426	-71.58E

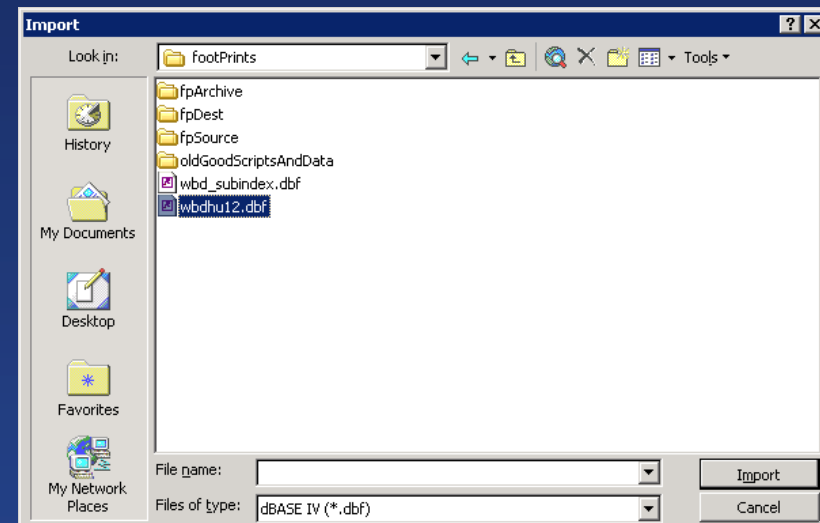
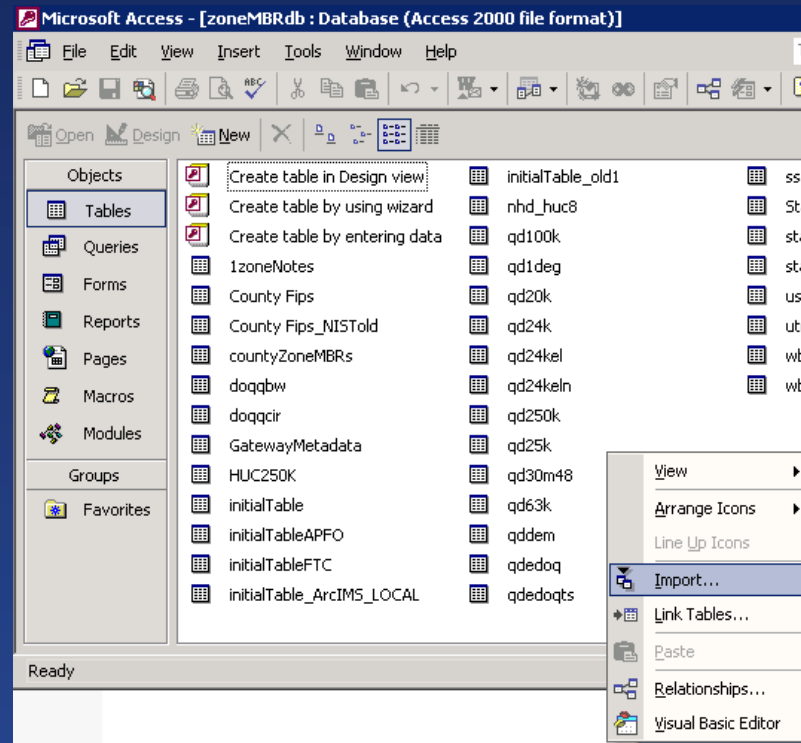
The resulting shapefile from the addMBRFields.exe does not have projection information, so it must be defined from the original:



The .dbf file must be copied and renamed to wbdhu12.dbf and imported in to the ZoneMBR.mdb database on each Gateway server



In the ZoneMBR.mdb database, rename the old wbdhu12 table to wbdhu12-old, and import the new wbdhu12.dbf in to the database on each Gateway server



Run the DataServices_Driver.exe for all states to test order placement for WBD products on the Gateway; at completion, ensure the log file is error free (rename WBDHU12 previews first if any data was deleted).

The screenshot shows the DataServices_Driver application window. Red arrows point to the following fields:

- webConnect: <http://ims2.ftw.nrcs.usda.gov>
- ASPPath: /Gateway/DataServices/DataService_SDEVec.asp
- Product ID: 45 WBDHU12
- County: *
- State: *

The application window contains the following sections:

- REQUEST**: A text area for entering a request.
- REPLY**: A text area for displaying a reply, with a "Clear" button.
- IDENTIFIER**: Fields for Order ID (10001), Item ID (10001_01), and Minimum Bounding Rectangle (North: 41.393, West: -95.871, East: -96.47, South: 41.19).
- ITEM INFORMATION**: Fields for Product ID (45 WBDHU12), Delivery (CD), Projection (4269 Geographic (Lat/Lon) NAD83), Clipping (Standard), Compression (Zip), VectorFormat (Shape File), ImageFormat (Native), and AValue (-7 SCA teleAtlas and ag).
- STATUS**: A text area for displaying status, with a "Clear" button.
- Buttons**: "Web", "Place", "All states using current product", "1 Degree Loop on Rectangle using current Product", "Clear", and "Quit".

Run the CatalogFP_Maker.exe to create a footprint and extent of coverage of the Gateway product; at completion, ensure the log file is error free.

Integrity Check then Make a Catalog Foot Print Shape file

1-PatternMatch

<input type="radio"/> EDRG20K	<input type="radio"/> TGRBLKG	<input type="radio"/> DMBLKG
<input type="radio"/> EDRG24K	<input type="radio"/> TGRBLKS	<input type="radio"/> DMTRACT
<input type="radio"/> EDRG25K	<input type="radio"/> TGRCDC	<input type="radio"/> DMPOSTLA
<input type="radio"/> EDRG63K	<input type="radio"/> TGRCNTY	<input type="radio"/> DMPOSTLP
<input type="radio"/> EDRG100K	<input type="radio"/> TGRHYD	<input type="radio"/> DMPLACE
<input type="radio"/> EDRG250K	<input type="radio"/> TGRRAIL	<input type="radio"/> DMMCD
<input type="radio"/> DEMASCII	<input type="radio"/> TGRROAD	<input type="radio"/> DMCNTY
<input type="radio"/> NED10M	<input type="radio"/> TGRTRACT	<input type="radio"/> DMSTATE
<input type="radio"/> NED30M	<input type="radio"/> TGRURB	<input type="radio"/> DMWATERL
<input type="radio"/> IFSARCDR	<input type="radio"/> TGRWAT	<input type="radio"/> DMWATERA
<input type="radio"/> IFSARDSM	<input type="radio"/> PRCPANN	<input type="radio"/> DMWATMAJ
<input type="radio"/> IFSARDTM	<input type="radio"/> PRCPMTH	<input type="radio"/> DMRETAIL
<input type="radio"/> IFSARORI	<input type="radio"/> TEMPMIN	<input type="radio"/> DMRECAR
<input type="radio"/> EDOQ	<input type="radio"/> TEMPMAX	<input type="radio"/> DMAIRPRT
<input type="radio"/> DQQQCIR	<input type="radio"/> TEMPAVE	<input type="radio"/> DMPARK
<input type="radio"/> DQQQBW	<input type="radio"/> CLU	<input type="radio"/> DMINST
<input type="radio"/> NLCD	<input type="radio"/> NAIPQQ03	<input type="radio"/> DMTRANST
<input type="radio"/> MDRGNRCS	<input type="radio"/> NAIPM03	<input type="radio"/> DMLNDRMK
<input type="radio"/> MDOQNRC	<input type="radio"/> NAIPQQ04	<input type="radio"/> DMRAIL
<input type="radio"/> MDOQAPFO	<input type="radio"/> NAIPM04	<input type="radio"/> DMSTREET
<input type="radio"/> MDOQERM	<input type="radio"/> NAIPQQ05	<input type="radio"/> DMHWY
<input type="radio"/> ADS40	<input type="radio"/> NAIPM05	
<input type="radio"/> MDOQHI_0	<input type="radio"/> NAIPQQ06	<input type="radio"/> ELCON250
<input type="radio"/> MDOQHI_N	<input type="radio"/> NAIPM06	<input type="radio"/> ELCON50
<input type="radio"/> MDOQHI_C	<input type="radio"/> NAIPM07	<input type="radio"/> ELCON10
<input type="radio"/> MDOQ1M_N	<input type="radio"/> QD12K	<input type="radio"/> GNISPOP
<input type="radio"/> MDOQ1M_C	<input type="radio"/> QD20K	<input type="radio"/> GNISNONP
<input type="radio"/> MDOQHIPC	<input type="radio"/> QD24K	
<input type="radio"/> MDOQHIPP	<input type="radio"/> QD25K	<input type="radio"/> CENDEMG
<input type="radio"/> FEMAQ3	<input type="radio"/> QD63K	<input type="radio"/> CENECON
<input type="radio"/> HUC250K	<input type="radio"/> QD100K	<input type="radio"/> CENHOUS
<input type="radio"/> WBDHU8	<input type="radio"/> QD1DEG	<input type="radio"/> CENSACL
<input checked="" type="radio"/> WBDHU12	<input type="radio"/> QD250K	<input type="radio"/> MLRA
<input type="radio"/> NHD24K		<input type="radio"/> CRA
		<input type="radio"/> NASS_CD

2-Select Directory containing all the data for the pattern

\\gateway2.ftw.nrcs.usda.gov\ftp

\\gateway2.ftw.nrcs.usda.gov\ftp\Gateway

WBDHU12

3-Source Shape Map

D:\Gateway\footPrints\fpSource\wbd_subindex

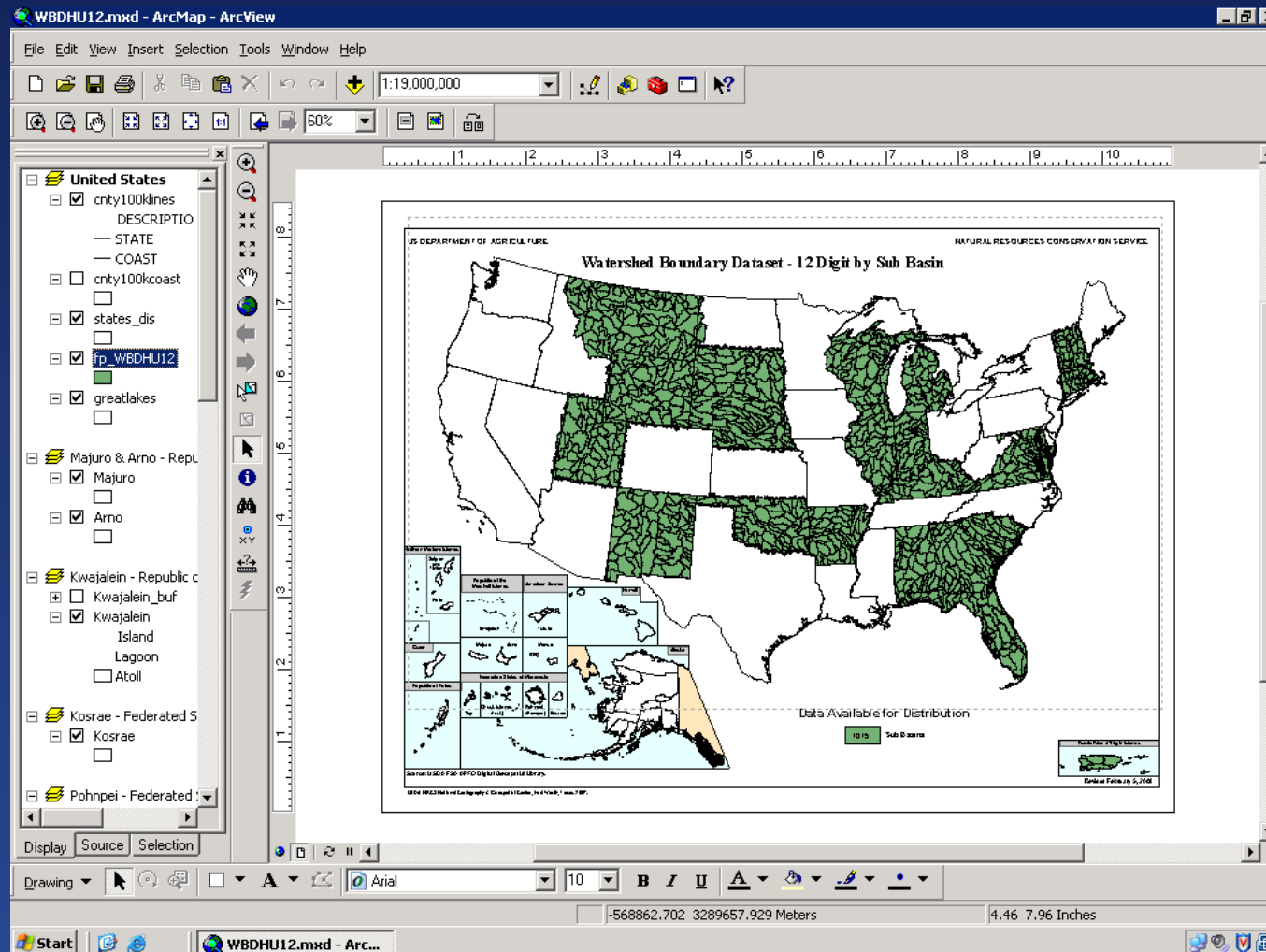
CatID field	Len	CatDesc Field	Len
CatID	8	CatDesc	60
MBR Precision	10	MBRScale	5
DataPath	18	FIPS_C	216

4-Destination Shape

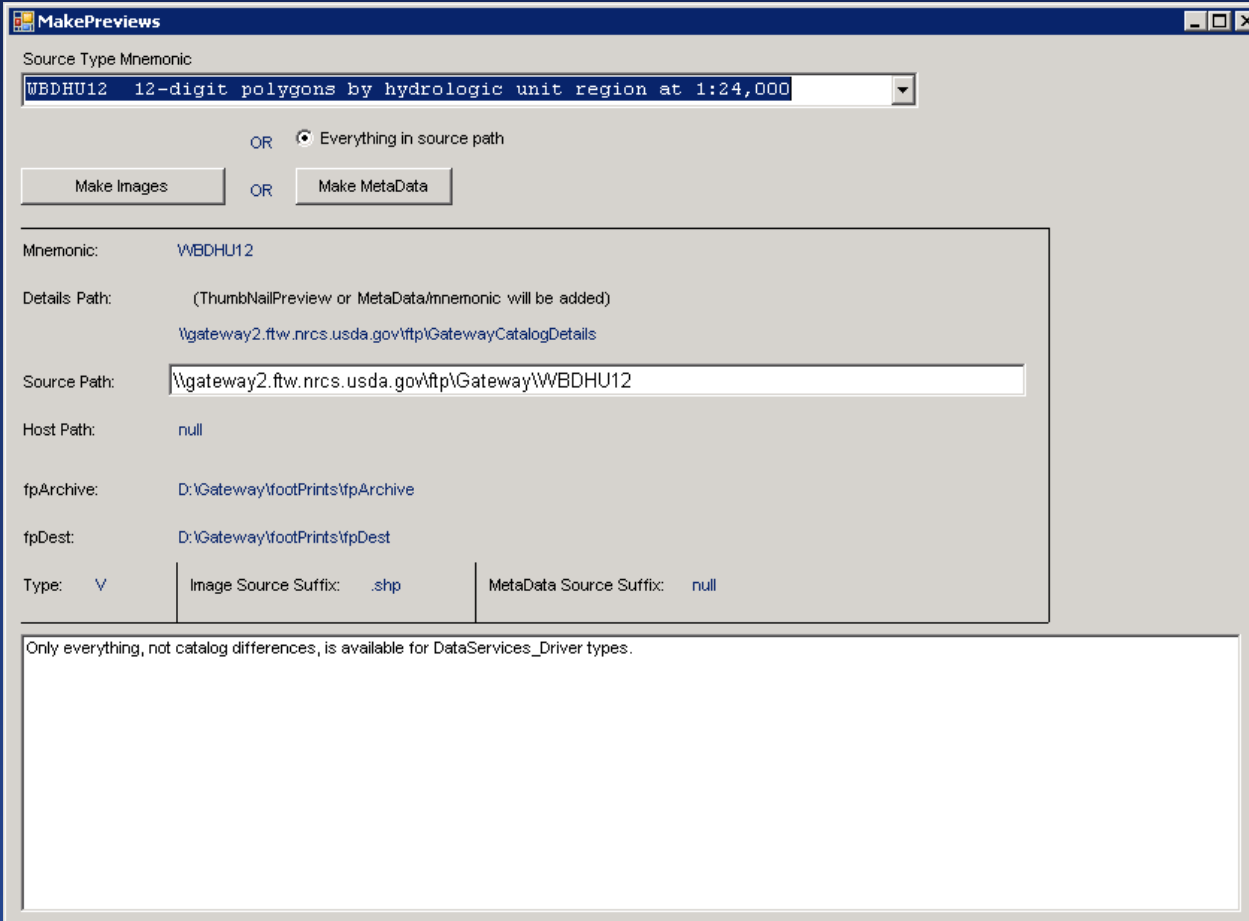
D:\Gateway\footPrints\fpDest\fp_wBDHU12

5-Make Shape File

Update the Gateway WBD product status map with the footprint shapefile.



Run MakePreviews.exe for the product for “Everything in source path” to update preview images for the Gateway ordering process; at completion, ensure the log file is error free.



The screenshot shows the 'MakePreviews' application window. At the top, there's a 'Source Type Mnemonic' dropdown menu with the value 'WBDHU12 12-digit polygons by hydrologic unit region at 1:24,000'. Below this, there are two radio buttons: 'OR' followed by 'Everything in source path' which is selected. Underneath the radio buttons are two buttons: 'Make Images' and 'Make MetaData', separated by an 'OR'. The main area of the window contains several fields: 'Mnemonic:' with the value 'WBDHU12'; 'Details Path:' with the value '(ThumbNailPreview or MetaData/mnemonic will be added) \gateway2.ftw.nrcs.usda.gov\ftp\GatewayCatalogDetails'; 'Source Path:' with the value '\gateway2.ftw.nrcs.usda.gov\ftp\Gateway\WBDHU12'; 'Host Path:' with the value 'null'; 'fpArchive:' with the value 'D:\Gateway\footPrints\fpArchive'; 'fpDest:' with the value 'D:\Gateway\footPrints\fpDest'; 'Type:' with a dropdown showing 'V'; 'Image Source Suffix:' with the value '.shp'; and 'MetaData Source Suffix:' with the value 'null'. At the bottom of the window, there is a text box containing the message: 'Only everything, not catalog differences, is available for DataServices_Driver types.'

Create a news.htm file with current date for the Gateway based on the updated subbasins from the log file of the CatalogFP_Maker.exe.

